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A TEXT-BOOK OF OBSTETRICS

BY

ADAM H. WRIGHT

PROFESSOR OF OBSTETRICS, UNIVERSITY OF TORONTO
OBSTETRICIAN AND GYNÆCOLOGIST TO THE
GENERAL HOSPITAL, TORONTO, CANADA

WITH TWO HUNDRED AND TWENTY-FOUR ILLUSTRATIONS IN THE TEXT

NEW YORK AND LONDON
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JUL 6 1940

TO

WILLIAM OSLER

REGIUS PROFESSOR OF MEDICINE AT OXFORD

PROFESSOR OF MEDICINE, JOHNS HOPKINS UNIVERSITY

BALTIMORE

A GOOD PHYSICIAN

A KIND FRIEND

"There are many speculations in Literature, Philosophy, and Religion, which, though pleasant to walk in, and lying under the shadow of great names, yet lead to no important result. They resemble rather those roads in the Western forests of my native land, which, though broad and pleasant at first, and lying beneath the shadow of the great branches, finally dwindle to a squirrel track, and run up a tree."

—LONGFELLOW, *Hyperion.*

"I am not only ashamed, but heartily sorry, that, besides death, there are diseases incurable: yet not for my own sake, or that they be beyond my Art, but for the general cause and sake of humanity, whose common cause I apprehend as my own."

—BROWNE, *Religio Medici.*

PREFACE

THIS book has been published at the request of students and fellow practitioners. An intimate association with students and physicians and a careful study of their wants have convinced me that a work on Obstetrics should be practical in the broadest sense of the word.

I recognize the fact that students have learned anatomy and physiology before they commence the study of obstetrics, and I have therefore given only a summary of facts anatomical and physiological which are important from an obstetrical standpoint. While the brief chapters on anatomy and physiology are intended especially for students, the main portion has been written for both students and physicians.

In my endeavors to be practical I have adopted chiefly clinical methods. I desired to avoid the "lecture style" in writing; but I have to acknowledge that my dogmatic manners as a teacher, and a considerable amount of egoism, are evident in many parts. As an excuse for this, I shall follow Herman in quoting the words of Bacon: "The manner of the tradition and delivery of knowledge which is for the most part magistral and peremptory . . . in a sort as may be soonest believed and not easiliest examined . . . in compendious treatises for practise . . . is not to be disallowed."

By abbreviating certain chapters and abstaining from theorizing, I have been able to devote considerable space to the proper treatment of very important subjects without making a large book. The description of the management of normal labor has been made as nearly complete as possible, no detail, great or small, being overlooked. The importance of exact and correct knowl-

edge of normal labor with all its preventive possibilities is perhaps better appreciated on this continent than in older countries, because a kind Providence has thus far mercifully preserved us from the licensed midwife.

In the consideration of pathological and operative obstetrics an effort has been made to give full and definite directions for the treatment of all the emergencies which arise in the practise of midwifery. The pathological conditions arising in pregnancy, labor and the puerperium, and the relationship between them and such diseases as tuberculosis, appendicitis, heart disease, syphilis, gonorrhœa, nephritis, general toxæmia, etc., have been fully discussed.

The Book is divided into two parts: I. Physiological Obstetrics; II. Pathological and Operative Obstetrics. In making such a division, which is done partly for teaching purposes, it is not presumed that a definite line always separates the normal from the abnormal in midwifery. Part I contains the subjects of the third-year course; Part II contains those of the fourth-year course in the University of Toronto.

I am indebted to Dr. Fothingham, Dr. McIlwraith, Dr. Fenton, Dr. MacMurchy, Dr. Goldie, Dr. R. H. Mullin and Dr. Malloch for kind assistance in connection with the reading matter, and also to Dr. Edmund E. King, who took charge of the preparation of the illustrations, and was assisted by Dr. E. M. Walker. We have used chiefly the specimens and material in the University Museum and the Burnside Lying-in Hospital. The cuts illustrating the repair of lacerations of the pelvic floor and perinæum are reproduced from drawings from life in the Burnside, by Dr. Walker. I have to thank Dr. Howard Kelly, Dr. Whitridge Williams and others, for some illustrations which I have borrowed. I have also to thank my Publishers, and especially Dr. Broome, for valuable suggestions, and for unvarying kindness and courtesy.

Adam H. Wright.

30 Gerrard Street, E., Toronto, Canada.

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PART I

PHYSIOLOGICAL OBSTETRICS

CHAPTER I

ANATOMY

GENERAL DESCRIPTION

The Pelvis.—The bony pelvis consists of four bones, the ossa innominata, the sacrum, and the coccyx. In early life the os innominatum has three bones, the ilium, the ischium, and pubes,

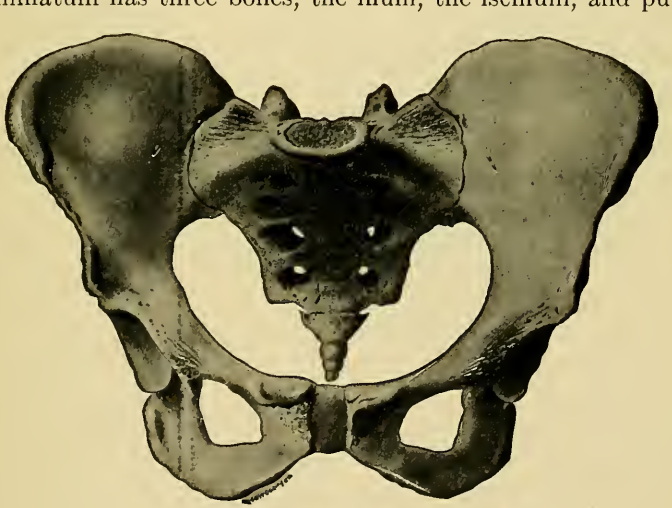


FIG. 1.—NORMAL FEMALE PELVIS (Williams). ×⅓.

united by a Y-shaped piece of cartilage with its center in the acetabulum. These unite at about the twentieth year. The last lumbar vertebra is important, especially in cases of deformed pelvis. The pelvis is divided into two parts; the *upper*, or false pelvis—that

portion above the brim; *the true pelvis*—that portion below the brim.

The brim, or inlet, is formed by the upper margin of the pubes in front, the ilio-pectineal line on either side, and the upper and anterior margin of the sacrum behind.

The cavity of the pelvis is bounded by the sacrum and the coccyx behind, the pubic bones in front, the inner surfaces of the innominate bones with the sacro-sciatic ligaments and the muscles attached to them at the sides. The outlet is lozenge-shaped and is bounded behind by the sacro-sciatic ligaments converging to

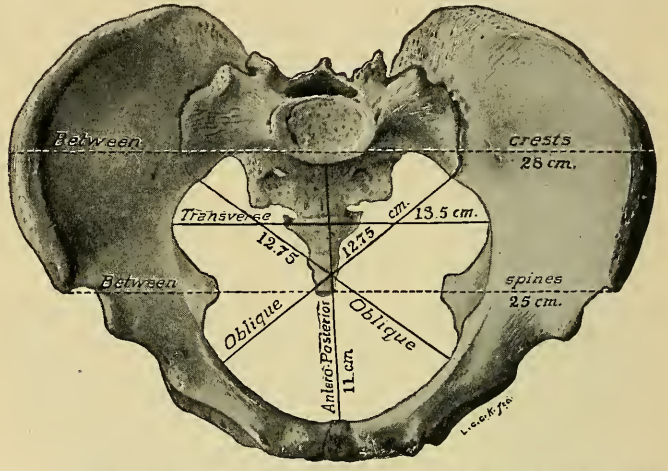


Fig. 2.—Normal Female Pelvis showing Diameters of the Superior Strait (Williams). $\times \frac{1}{3}$.

the tip of the coccyx, at each side by the tuber ischii, and in front by the rami of ischia and pubes converging to the lower margin of the symphysis pubis. The pelvic brim is sometimes called the superior strait; the outlet, the inferior strait.

Differences in Sexes.—The female pelvis differs from the male in the following respects: it is shallower, wider and less funnel-shaped, smoother, thinner, weaker; the fossa of the ilium is generally smaller and shallower; the rami of the pubes and ischia are more everted; the pubic spines are farther apart; the diameters at the inlet are greater, especially the transverse; the inlet is rounder and the pubic arch more open.

The plane of the brim, in the erect position, is more nearly

vertical than horizontal. It makes an angle of sixty degrees with the horizon. The promontory of the sacrum is about $3\frac{3}{4}$ inches (9 cm.) above the pubes when the body is erect. In pregnancy, or in the case of a large abdominal tumor, the pelvic inclination is diminished.

Articulations of the Pelvis.—*Sacro-iliac synchrondrosis.* The bones are united by cartilages, but in adult women, especially in pregnancy, a synovial membrane intervenes and a small degree of movement is allowed.

Symphysis Pubis. The fibro-cartilage is thicker in front than behind and a small synovial membrane is found in the back part.

Sacro-coccygeal Articulation. There is a cartilage and a synovial membrane between sacrum and coccyx. During pregnancy, cartilages and fibrous structures become swollen and softened; the synovial cavities become extended and the mobility increased.

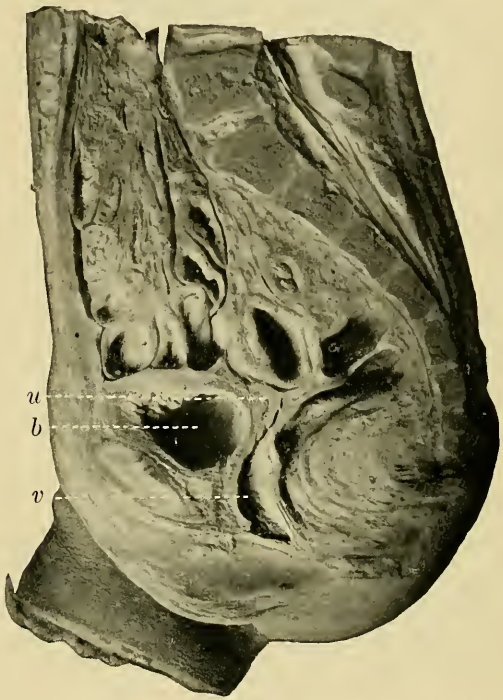


Fig. 3.—Sagittal Section, Five-year-old Girl.

u, uterus; *b*, bladder; *v*, vagina slightly distended with a tampon. (Primrose, Tor. Univ. Museum.)

Pelvic Planes.—These are imaginary levels at any portion of the pelvic circumference of the inlet, cavity, outlet, etc., of the pelvis.

Plane of Inlet, or Brim. This extends from the top of the sacrum to the most prominent point of the symphysis pubis.

Median Plane. This extends from the center of sacrum to the center of the symphysis pubis, etc.

Plane of Outlet. This extends from the lower part of the sym-

physis pubis to the lowest point of the sacrum, etc., or the lowest point of coccyx, according to some.

Axis of Pelvis.—This is an imaginary line indicating the course of the center of the fœtal head as it passes through the pelvis, sometimes called the circle of Carus, although it is not really a circle nor an arc of one. On the inner surface of the ischium there are two planes separated by a line passing from the ilio-pectineal eminence to the spine of the ischium, called the anterior and posterior planes of the ischium. Two other planes are formed by the inner surface of the pubic bones in front, and by the upper portion of the sacrum behind, both directed downward and backward. These planes, in conjunction with the spines of the ischia, are supposed by some to assist in rotating the fœtal head in delivery.

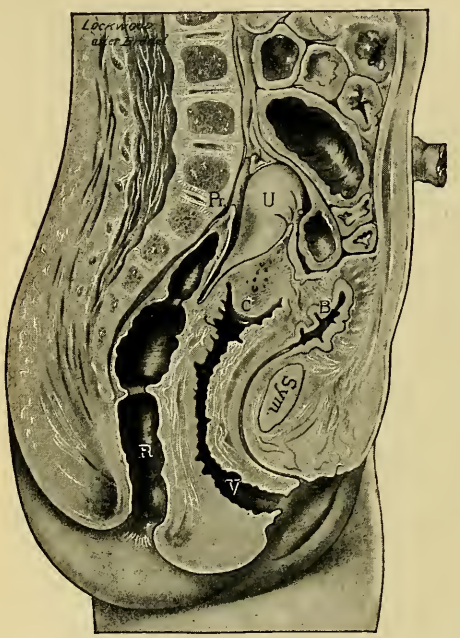


Fig. 4.—Sagittal Section through Body of Newly Born Child (Williams).

The Pelvis in Infancy and Childhood.—The pelvis is funnel-shaped, and the pubic arch forms a more acute angle; the tubera ischii are relatively nearer together than in the adult. It is small even in proportion to the size of the child. The iliac fossæ are flatter, more upright, and their surfaces look more forward; the maximum distance between the iliac crests is hardly greater than that between the anterior superior spines. The sacrum is narrower in proportion than in the adult pelvis.

The three portions of the innominate bones are not united until about the twentieth year. The pelvis is largely developed at the time of puberty, partly by the development of the different bones and partly by the action of mechanical forces; the wings of the sacrum, especially, grow, making the transverse diameter greater.

The pressure produced by the weight of the body, transmitted through the sacrum, assists in moulding the bones. The pressure and tension of muscles also assist.

The Pelvic Floor.—The structures closing the pelvis form a complete diaphragm in which there are three faults or slits (Berry Hart), the urethra, the vagina, and the rectum. The vagina is the most important of these slits, from an obstetrical point of view. The outlet, when compared with the capacious vaginal cavity, may be likened to the narrow vent of a funnel with a wide mouth (Hunter Robb).

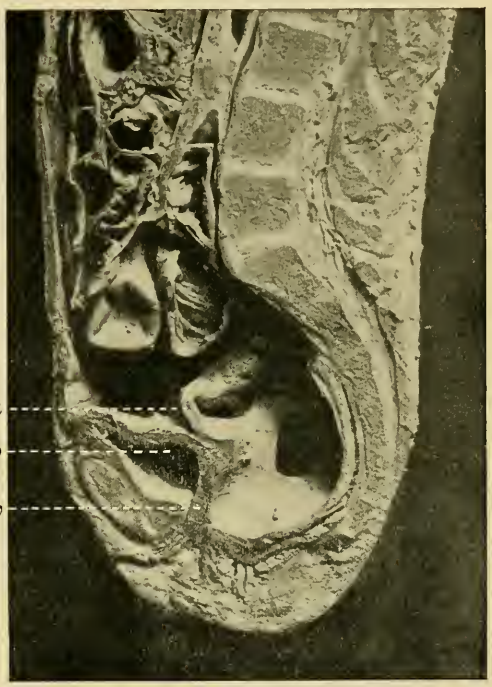


FIG. 5.—SAGITTAL FROZEN SECTION, NINE-YEAR-OLD GIRL.

v, vagina; *u*, uterus; *b*, bladder. (Primrose, Tor. Univ. Anatomical Museum.)

The floor of the pelvis includes on each side: the visceral layer of the pelvic fascia (rectal, recto-vesical, and vesical portion); the parietal layer of pelvic fascia (also called "deep layer of triangular ligament"); the triangular ligament; the fascia of Colles; the following muscles: coccygeus, pyriformis, levator ani, a portion of obturator internus, deep and superficial transversus perinæi muscles, constrictor vaginæ, and external sphincter ani; the skin and subcutaneous tissue.

The perineal body (so-called) is the triangular body between the vagina and rectum, the skin between the two forming its base, about 1 inch (2.5 cm.) in length. The apex is about 1½ inches (4 cm.) above, where the walls of the rectum and vagina unite. The

following structures are found in this perineal body: the deep fascia (two layers); a part of sphincter ani muscle; a part of levator ani muscle; a part of constrictor vaginæ muscle; the junction of transversus perinæi muscles; some connective tissue, fat, and subcutaneous fascia; and the skin.

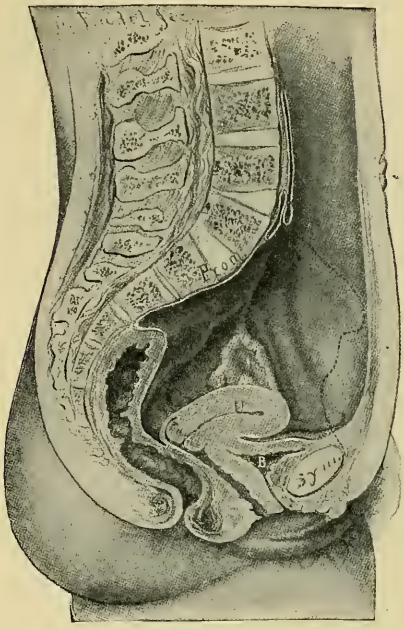


Fig. 6.—Sagittal Section through Adult Woman (Kelly), reduced to the Same Size as Fig. 3 for Comparison (Williams)

The sheets of fascia (especially the recto-vesical fascia) are the strongest structures in the pelvic floor and probably form the main support of the pelvic contents. The chief function of the levator ani muscle is to pull forward and upward the post-vaginal structures of the pelvic floor, especially the lower extremities of the rectum and vagina, and to form to some extent sphincters for both.

Note.—The pelvic floor consists of two parts, the structures of which meet in a median rhaphe. Injuries to the pelvic floor, during labor, generally occur on one or both sides of the median line.

THE FEMALE REPRODUCTIVE ORGANS

The female reproductive organs are divided into the external, or copulative organs; the internal, or formative organs.

EXTERNAL ORGANS

Mons Veneris.—This is the cushion of adipose and fibrous tissue lying over the symphysis and horizontal rami of the pubes.

Labia Majora.—These are the two sides of the vulva extending from the mons veneris in front to the fourchette behind.

Labia Minora, or Nymphæ.—These are two folds of skin (not mucous membrane) existing inside of the labia majora, uniting anteriorly in the middle line where they form the prepuce of the clitoris.

Clitoris.—This is a small erectile tubercle, the homologue of the penis in the male, about half an inch below the anterior commissure of the labia majora.

Vestibule.—This is a triangular surface covered with mucous membrane, bounded at its apex by the clitoris, on either side by the labia minora, and having at its base the anterior margin of the opening of the vagina. The urethral aperture is situated at, or a little above, the center of the base.

Fourchette.—This is the bridge of the skin behind the vulva.

INTERNAL ORGANS

Urethra.—This is the canal 1½ inches (4 cm.) in length, through which the bladder is emptied.

Vagina.—The vagina is the canal in the pelvic floor which forms the communication between the external and the internal organs of generation. The vaginal orifice lies between the vestibule and the fourchette, and is wholly or partially covered by hymen. The anterior wall is closely related to the base of the bladder; the posterior wall to the rectum; the sides to the broad ligaments and pelvic fascia. The vulvo-vaginal glands are situated near the posterior part of the vaginal orifice. The fossa navicularis, situated between the hymen and the perinæum, is a small depression which disappears after child-bearing.

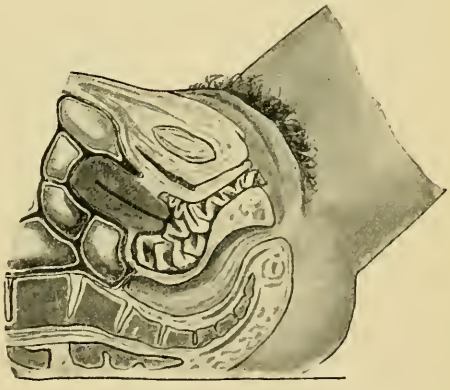


Fig. 7.—Vagina Ballooned by Gauze-Packing, showing a Large Cavity with a Small Outlet.

Uterus.—The uterus is a hollow muscle, an incubator chamber, for the reception and development of oösperms (Bland Sutton),

situated behind the bladder and in front of the rectum. The anterior surface is somewhat flatter than the posterior. In infancy and childhood it is small and the neck is larger than the body.

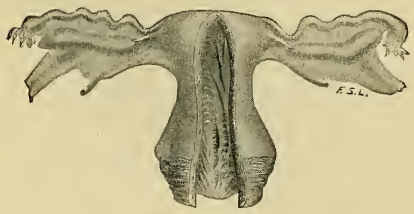


Fig. 8.—Uterus and Appendages of Young Child (Williams). ×⅔.

At puberty there is a remarkable development, the uterus increasing about 50 per cent. during menstruation. After the menopause it atrophies. The virgin uterus is 2½ inches (7 cm.) long and weighs about 1 ounce (.31 gm.).

The uterus is divided into three regions: the fundus uteri, the arched portion above the straight line joining the ends of the oviducts; the corpus uteri, the portion triangular in shape between the Fallopian tubes and the cervix; the cervix uteri, the lower fusiform portion.

Structure. The wall of the uterus is made up of three layers, peritoneal or serous, muscular, and mucous.

Peritoneal. The peritonæum passes from the bladder on to the uterus at the isthmus, up the anterior surface of the fundus, thus forming the utero-vesical pouch. It then passes over the fundus, down the posterior surface of the uterus and a small portion of the vagina (less than 1 inch) and then up the anterior wall of the rectum, thus forming the pouch of Douglas. When the bladder is distended the peritonæum on the anterior surface of the uterus is pulled up to the fundus. Normally the utero-vesical pouch and the pouch of Douglas contain no small intestine.

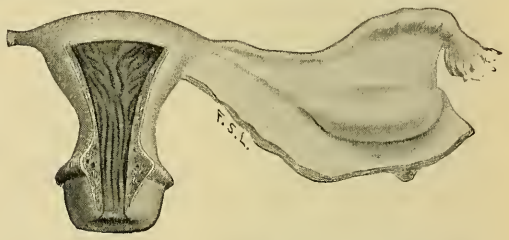


Fig. 9.—Uterus and Appendages of Fourteen-year-old Girl (Williams). ×⅔.

Muscular. The muscular wall of the uterus is about ½ inch (1 cm.) thick and consists of interlacing bundles of smooth muscular fibers. Two layers are described (sometimes three). A thin external, or subperitoneal layer, supplying strands which pass into the ligaments of the uterus; an internal layer, thick, contin-

uous with the muscle of the vagina. Elastic and ordinary connective tissue exists between the muscle bundles. There are special muscular rings around the inner ends of the Fallopian tubes, the os internum, and the os externum.

Mucus. The mucosa of the body is about $\frac{1}{30}$ to $\frac{1}{15}$ inch thick under ordinary circumstances, but grows thicker before the men-

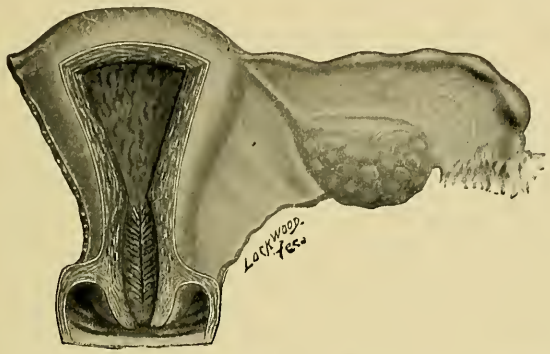


FIG. 10.—UTERUS AND APPENDAGES OF TWENTY-YEAR-OLD MULTIPARA (Williams). ×⅔.

strual period. It is implanted directly on the muscular wall without the intervention of a submucous layer. The lining epithelium consists of ciliated columnar cells. The glands, crypts, or follicles, single or branched, are tubular, and their openings are visible on slight magnification. The interglandular tissue, composed of tissue of a low or embryonic type, forms the main portion of the mucosa. The mucosa of the cervix is continuous with that of the corpus, there being no definite line of demarcation

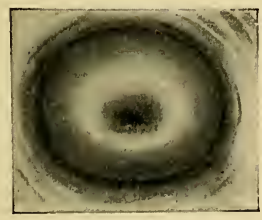


FIG. 11.—VIRGINAL EXTERNAL OS (Williams).

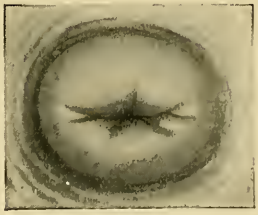


FIG. 12.—PAROUS EXTERNAL OS (Williams).

between them. It is folded, however, to form the arbor vitæ—i e., a vertical ridge on the anterior and posterior wall, with branch-

ing ridges extending from it. The epithelium is columnar, ciliated on the ridges, but not between them. The glands are racemose and lined by columnar epithelium.

Cavity of Uterus. The body is triangular in shape, the openings of Fallopian tubes being at the upper angles, and the os internum at the lower angle. The anterior and posterior walls are in contact. Its capacity is ½ to 1 dram. The neck is fusiform. On the anterior and posterior walls are longitudinal ridges, the arbor vitæ uterina. The cervical glands are racemose and extend

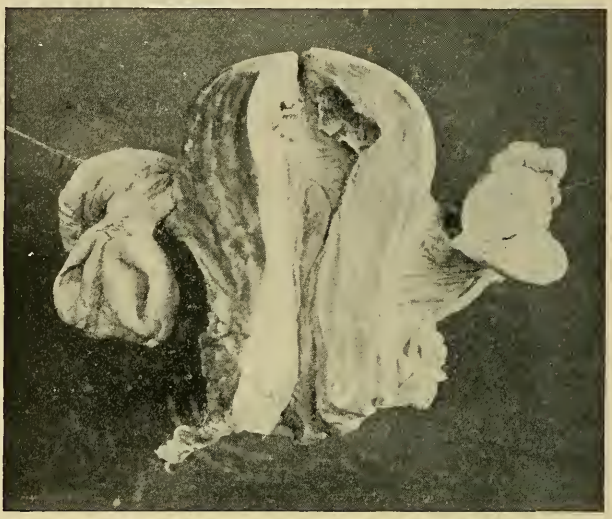


Fig. 13.—Nabothian Follicles; Cyst-like Bodies from Obstruction of the Ducts of the Cervical Glands. (Tor. Univ. Museum.)

from the surface of the mucosa into the stroma. When their ducts are occluded cysts are formed which are called Nabothian follicles or ovula Nabothi.

Blood-Vessels. The ovarian arteries, from the aorta close to the renal arteries (the right ovarian frequently from the right renal artery), pass between the layers of the broad ligament, running tortuously through it to the upper angle of the uterus, where they anastomose with the uterine arteries. In their course branches are given off to supply the ovaries, Fallopian tubes, and round ligaments. The uterine arteries, from the anterior division of the internal iliac, pass between the layers of the broad ligament

toward the cervix. After giving off branches to the cervix which anastomose with those of its fellow on the opposite side and with branches of the vaginal artery lower down, each artery on its own side passes upward, supplying the body of the uterus, its terminal branches anastomosing with those of the ovarian artery. The *vaginal arteries*, from the anterior division of the internal iliac, anastomose with the lower branches of the uterine. The *internal pudic arteries*, from the anterior division of the internal iliac, supply the perinæum.

Lymphatics. The lymphatics of the external genitals and the lower portion of the vagina terminate in the inguinal glands; those of the upper portion of the vagina and cervix in the hypogastric glands; and those of the body of the uterus in the lumbar glands.

Nerves. The nerve supply of the uterus is derived from both spinal and sympathetic nerves, the spinal from the fourth sacral and pudic nerves, the sympathetic from the inferior hypogastric plexus.

Ligaments. The *round ligaments* are two flattened cords, four inches long, one on each side, extending from the upper angle of the uterus upward, outward, and forward, through the inguinal canals to the upper part of the labium majus. The *broad ligaments* are formed by a double layer of peritonæum continuous with the anterior and posterior coverings of the uterus at either edge. They run from the uterus to the corresponding side wall of the pelvis in front of the sacro-iliac joint. The *utero-sacral ligaments* are two bands covered with peritonæum, passing posteriorly from the upper third of the cervix to the third sacral vertebra; in each ligament there is a flat band of muscle running along its outer part. The *utero-vesical ligaments* are two folds of peritonæum passing from the sides of the uterus to the bladder and the internal boundaries of the utero-vesical pouch.

Anomalies of Uterus and Vagina.—Faulty or arrested development of Müller's ducts may cause anomalies of the uterus, the vagina, or of both. The chief varieties are: *uterus unicornis, uterus bicornis,* the uterus being bifid at upper extremity only; *complete double uterus* with one vagina; *complete double uterus and vagina; uterus masculinus*

Oviducts or Fallopian Tubes.—These are tubes situated one on each side of the uterus in upper border of the broad ligament. Each tube is 4½ inches (11 cm.) long and consists of the narrow isthmus near the uterus, the ampulla or wider portion near the

ovary, and the infundibulum or fimbriated extremity. The fimbriæ run from the fringed edge of the ampulla. One fimbria is attached to the ovary and is called the tubo-ovarian ligament, or the fimbria ovarica. A narrow strip of the lower surface of the tube is in contact with the connective tissue between the two layers of the broad ligament. Each has three coats: external or peritoneal; middle or muscular; internal or mucous lined with columnar ciliated epithelium.

The Parovarium or Organ of Rosenmüller.—This is the homologue of the epididymis in the male. It is situated in the broad ligament, on either side, between the ovary and the ampulla of the Fallopian tube, and is lined by ciliated epithelium. It is composed

Fig. 14.—Longitudinal Folds of Tubal Mucosa (Williams).

of tubules which converge toward the ovary and are connected by a longitudinal tube, the duct of Gärtner. This duct is a remnant of the Wolffian duct, and is the homologue of the vas deferens. This organ is originally the paroophoron plus the epoophoron, which are respectively the renal and sexual portions of the mesonephros in the female. These atrophy in development and the remains are called parovarium.

Ovaries.—These are two in number, very rarely three, are situated behind the broad ligament on each side at the level of the pelvic brim about midway between the psoas muscle and the uterus. The folds of the broad ligament form a sort of mesentery, the mesovarium attached to the hilum of the ovary. Each ovary is attached to the fimbriated extremity of the Fallopian tube by one fimbria, and is connected with the uterus by the ligament of the ovary. The ovaries are almond-shaped, and 1½ inches (3 cm.)

long, $\frac{3}{4}$ inch (2 cm.) wide, $\frac{1}{3}$ inch (1 cm.) thick, each weighing one to two drams (6 gm.). They are covered by a layer of cylindrical cells (germ epithelium) unlike the squamous epithelium of the peritonæum.

The outer surface is pale, looking like a mucous surface and not like the glistening peritonæum. "The white line of Farre" is the raised white line of tissue at the junction of the ovary and the broad ligament, marking the junction of the peritonæum and the layer of germ epithelium covering the ovary.

In the ovary there are two portions or zones. A medullary portion or zona vasculosa, consisting of connective tissue, unstriped muscle, and numerous blood-vessels and lymphatics. A cortical, or parenchymatous zone, a dense network of connective tissue containing primary, growing, and ripe Graafian follicles. A Graafian follicle is an ovisac—i. e., a sac containing an egg—of which there are probably from fifty to a hundred thousand in the ovary of a young girl. Fifteen to twenty may be seen by the naked eye. They have a capsule of three layers: the external, or tunica fibrosa, consisting of connective tissue with vessels; the internal, or tunica propria, consisting of non-vascular connective tissue; and the membrana granulosa, lining the tunica propria. This is the most important layer of the three, being an epithelial lining which is made up of rounded nucleated cells several layers deep. At points over this membrane the cells are heaped up in a mass (discus proligerus) surrounding the female sexual cell, the ovum.

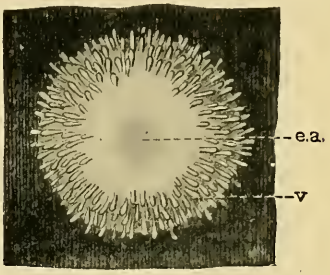


Fig. 15.—Human Ovum (Reichert). × 6.

e.a., embryonic area; *v.*, villi.

The ovum or ovule is a highly organized cell about $\frac{1}{200}$ inch (.01 mm.) in diameter, and has a structure peculiar to itself. There is a tough, elastic, and transparent investing membrane, called the *vitelline membrane* or *zona pellucida.* This surrounds a semifluid protoplasmic mass, the *yolk* or *vitellus.* In this mass, corresponding to the nucleus of an ordinary cell, there is an oval body containing a few granules, but more transparent than the rest of the yolk, which is called the germinal vesicle. Among these granules is a spot, corresponding to the nucleolus of a cell—the germinal spot.

THE MAMMÆ OR MAMMARY GLANDS

These are two large milk glands, situated one on either side, between the two layers of the superficial fascia upon the pectoralis major muscle over a space corresponding to that between the third and seventh rib. Quite a third of each gland lies upon the serratus magnus muscle and beyond the anterior border of the axilla. The axillary lobe reaches upward in the axilla, to the upper border of the third rib, where it is in contact with the central set of the lymphatic glands.

Each gland presents three zones—peripheral, middle, and central—known as *Charpentier's zones*. The peripheral one is the largest; it has a smooth white surface, through which the underlying veins are easily visible. The middle zone, or areola, is about $\frac{1}{2}$ inch wide; its color is pale rose in virgins, slightly darker in brunettes, but this color becomes much darker during pregnancy. It contains many sebaceous glands, and in addition twelve to twenty papular or tubercle-like projections called the tubercles of Montgomery. The central zone is occupied by the nipple, which is nearly $\frac{1}{2}$ inch high and $\frac{1}{3}$ inch in diameter. Its surface is slightly roughened from the presence of papillæ. The nipple may be retracted; this is seen especially in malignant disease of the breast.

The gland itself is racemose, there being from fifteen to twenty lobes, each composed of lobules, which are again divided into acini or *cul-de-sacs*. The ducts of the lobules drain the acini and unite to form the excretory ducts of the lobes—galactophorous or milk ducts. These end in the lactiferous sinuses in the nipple. In addition to the glandular substance each contains transverse and longitudinal muscles and some connective tissue. Beneath the peripheral portion there is considerable fat. The skin covering the gland has developed in it sebaceous glands and hair follicles.

CHAPTER II

PHYSIOLOGY

Ovulation.—The chief functions of the ovary are to supply the ovum and to expel it, when ready for impregnation, into the Fallopian tubes. In the human female this expulsion is closely related to menstruation, occurring usually before the commencement of the period and immediately following the rupture of the follicle. Graafian follicles develop very early, but only begin to mature at puberty, and continue to mature throughout the entire child-bearing period. Ovulation, however, ceases during the periods of gestation and lactation. When ovulation is about to occur one of the follicles becomes especially developed, grows and becomes congested and distended with fluid. The coverings of the ovary over the follicle are thinned by pressure and rupture occurs. The ovule, surrounded by some cells of the membrana granulosa escapes into the fimbriated extremity of the Fallopian tube, which grasps the ovary over the site of rupture and is propelled along the tube by the cilia and the muscular contraction of the tube walls.

The follicle, after its rupture, and the escape of the ovum, is called the *corpus luteum*. Of these there are two kinds, the true and so-called false corpus luteum. The *true corpus luteum* is the corpus luteum of pregnancy. The follicle continues to grow until the third or fourth month and projects on the surface of the ovary, the size being 1 inch by $\frac{1}{2}$ inch (2.5 by 1 cm.). After this it commences gradually to decrease and disappears about the end of gestation. The *false corpus luteum* is formed when impregnation of the ovum does not occur. After the escape of the ovum the edges of the rent in the follicle adhere and the follicle shrinks. The inner layer becomes wrinkled and begins to show yellow folds, which enlarge and adhere, filling the cavity. The yellow color gradually changes to white. There is progressive diminution in size, and in about forty days disappearance occurs, leaving a slight depression on the surface of the ovary.

Menstruation.—This is known by various names, catamenia, periods, monthly sickness, courses, etc. It becomes established at puberty, in temperate climates at about fourteen to sixteen years, but it may come on earlier in hot climates and later in cold. It occurs regularly every twenty-eight days in the majority of women, although in some it may be every twenty-one. Its average duration is four to five days. The quantity of blood lost varies from 2 to 4 ounces (64–124 gm.); but this is more or less affected by climate and modes of living; more is lost by women living in hot climates or those living an easy, luxurious life. The blood is pure, but does not coagulate except when there are large amounts, on account of the mucus contained in it. At first it is dark, but becomes lighter in color. The menses usually have a slight odor. The blood is derived from the mucous lining of the uterus, the mucous membrane being intensely congested at the time of menstruation. The time of the cessation of menstruation is uncertain, but generally occurs at the age of forty-five to fifty, frequently earlier, sometimes later. After this time Graafian follicles no longer mature, and the ovaries become shriveled and wrinkled on the surface. The Fallopian tubes become atrophied and sometimes obliterated. The uterus decreases in size. This is especially marked in the cervical portion. Its projection into the vagina disappears, and the orifice of the os uteri in old women is often found to be flush with the roof of the vagina.

Theory of Menstruation.—Some say that menstruation depends on ovulation. There is certainly a close connection between ovulation and menstruation. Others say that ovulation does not determine menstruation, which is probably correct. It is likely that both ovulation and menstruation depend on a common cause, the periodic nervous excitation and congestion due to an impulse from the sympathetic system (Hirst). They generally occur together, but there are many exceptions and either may occur without the other.

Conception and Generation.—Conception means the union of two living elements—one male, the other female—and is effected by union of the spermatozoon with the ovum. This union is called fecundation or impregnation. It is simple or single if one ovum has been impregnated, multiple if two or more ova have been impregnated.

The spermatozoa are ejaculated in the semen, a viscid, opales-

cent fluid. Each has a head, body, and tail and possesses a power of movement similar to that of an eel in water. This movement is very important in conception. They may live for many days in the female genital tract.

Impregnation takes place probably in the Fallopian tubes near the pavilion. The spermatozoa move up through the uterus and tubes to meet the ovum. Even when deposited at the vulva they may pass up through the vagina, cervical canal, and uterus, into the Fallopian tubes. This is brought about partly by their own vibratory motion, and partly by their being sucked up by the uterus.

CHAPTER III

THE EMBRYO AND FŒTUS

Early Changes in Ovum.—After impregnation segmentation of the yolk begins. The yolk-mass becomes divided up into first two, then four, eight, sixteen, and so on, parts, each of which is a nucleated cell. When segmentation is completed some of the cells arrange themselves in a layer around the periphery of the ovum, thus forming a membrane enclosing the rest of the cells. The enclosed cells adhere in a mass to one spot on the inner surface of the enclosing layer and thus form the embryonic area. At this spot the embryo commences to be formed. The outer layer is called the epiblast; the inner layer of adherent cells the hypoblast. A middle layer grows from the angle of their union and is called the mesoblast. At the central part of the ovum a quantity of fluid appears.

The ovum now has four layers surrounding the cavity containing the fluid, which are from without inward—the zona pellucida; the epiblast; the mesoblast; the hypoblast. The three inner layers are fused together in the embryonic area. The mesoblast splits into two layers, one of which is united to the epiblast, forming the somatopleure; the other is united to the hypoblast, forming the splanchnopleure. The embryo now commences to be formed and sinks toward the center of the ovum and development into the fœtus is commenced. During this development from embryo into fœtus several very important structures are formed.

Decidua.—After impregnation the uterine mucous membrane becomes congested, convoluted, and hypertrophied; it is called the decidua vera. When the ovum enters the uterus it lodges between two folds of the decidua vera. The decidua grows around the ovum, forming the decidua reflexa. For a time there is a space between the decidua reflexa and decidua vera which contains a mucous fluid. At the end of three months this space it

obliterated by the union of the two layers. That portion of decidua vera on which the ovum rests is called the decidua serotina.

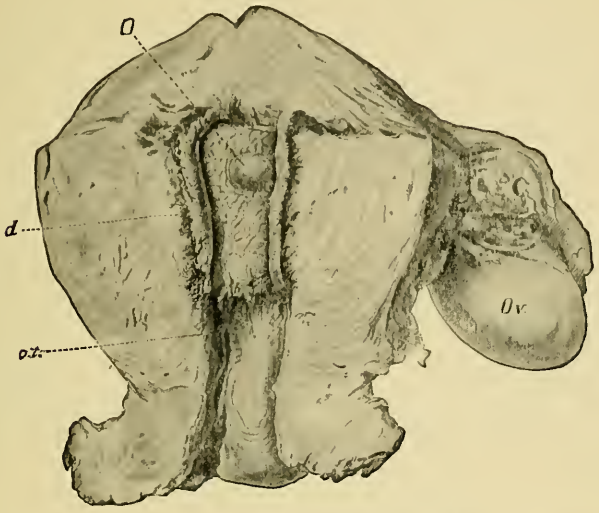


Fig. 16.—Uterus lined by Decidua, containing Seven- to Eight-Days' Ovum (Leopold). × 1.

There are three membranes surrounding the embryo from within outward: the amnion; the chorion; the decidua reflexa; and serotina.

The *amnion* is essentially a fœtal membrane, formed from a fold of the somatopleure, principally from the head to the tail ends, but also from the sides. Two layers are formed: (1) the internal layer of amnion, or true amnion, which surrounds the fœtus, but becomes gradually distended with amniotic fluid; (2) the external layer of amnion, or false amnion, or prechorion, which unites with the allantoic structures, forming the chorion.

Fig. 17.

Fig. 18.

Figs. 17, 18.—Diagrams showing Formation of Decidua Reflexa (Coste).

The *chorion* is made up of two layers, the prechorion or false amnion and the allantois. The allantois is a continuation of the intestinal mucous membrane, mostly solid, although there is a small hollow in the stalk. It spreads inside the

hollow amniotic pouch and finally surrounds the fœtus. The portion of the allantois within the abdominal walls becomes the apical part of the bladder and the urachus. The portion outside the abdominal plates forms the vasculosa or inner layer of the chorion and part of the umbilical cord. The vitelline membrane is so greatly thinned by enlargement of the ovum that it practically disappears. The chorion shortly becomes covered with projecting villi. Each villus receives a capillary vascular loop from the vessels of the allantois. These grow especially in that

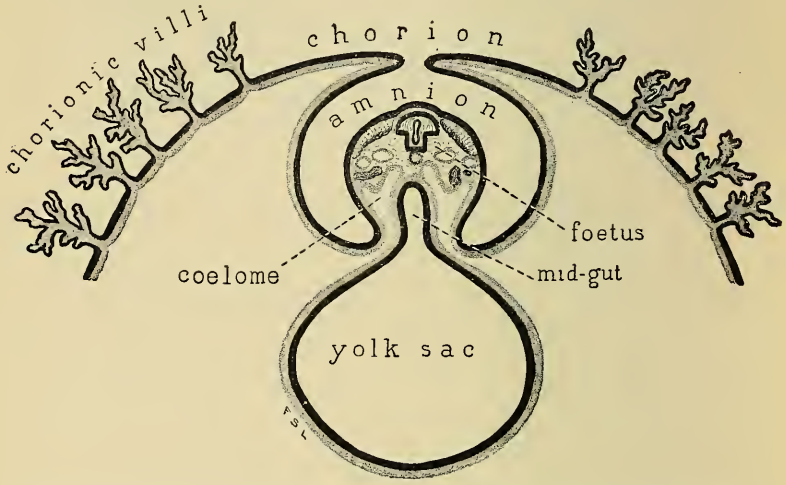


Fig. 19.—Diagram showing Transverse Section through Mammalian Embryo, showing Formation of Amnion (Williams).

part which is concerned in the formation of the placenta. The villi after a time disappear from the remaining portion of the chorion.

There is therefore from within outward the inner layer of the amnion containing the liquor amnii, in which the fœtus floats. Outside this there is the allantois united with the outer layer of the amnion forming the chorion. After a time the chorion blends with the decidua reflexa and the reflexa with the vera; so that at birth this outer layer is formed of three, the chorion, the decidua reflexa, and decidua vera; the inner layer is formed of the true amnion alone.

Placenta.—This in the human female is a circular mass attached to the internal surface of the uterus, generally at or near the fundus.

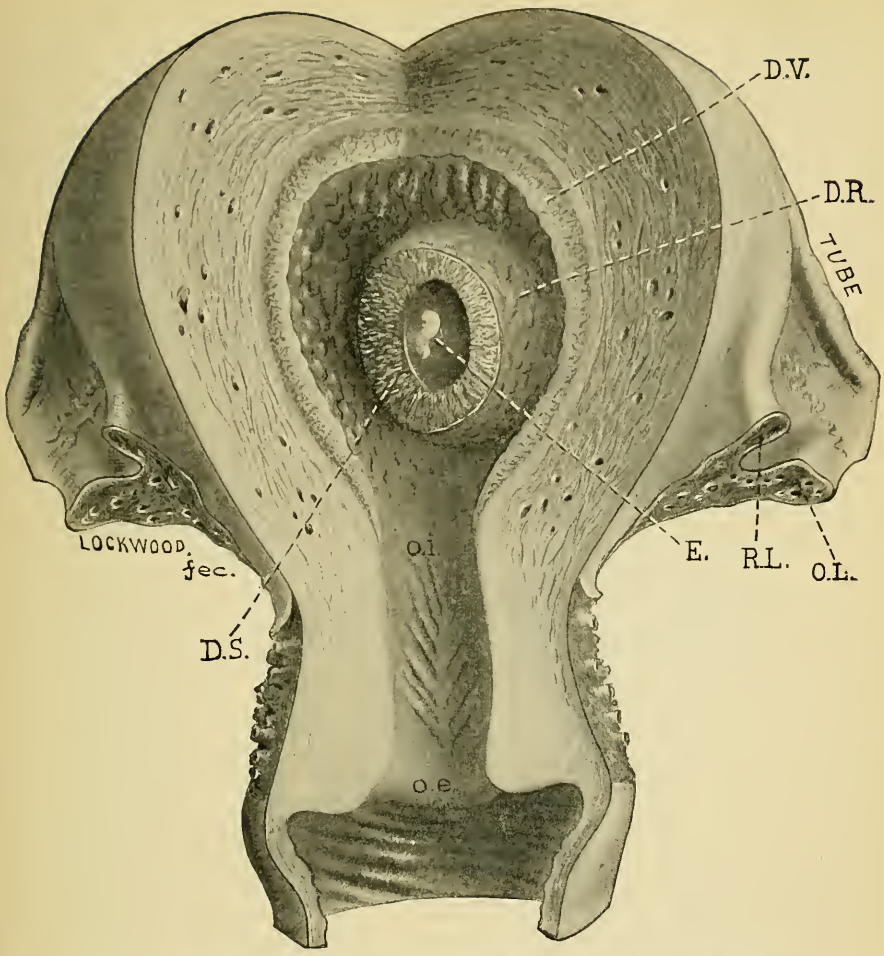


Fig. 20.—Seventeen-Days' Pregnant Uterus. × 1. (Anatomical Museum, Johns Hopkins University.) Embryo drawn relatively too large (Williams).

D.R., decidua reflexa; *D.S.*, decidua serotina; *D.V.*, decidua vera; *E.*, embryo; *O.L.*, ovarian ligament; *R.L.*, round ligament.

It is developed in the decidua vera. Its average diameter is from 6 to 9 inches; it weighs from 1 to 1½ pounds.

Its functions are: (1) respiration, (2) nutrition, and (3) excretion.

1. *Respiration.* It acts as the lung, or rather the gill, in oxygenating the fœtal blood by the interchange of gases which takes

place between the fœtal and maternal blood. The blood from the fœtus, darkened with carbon-dioxide, passes through the umbilical arteries to the placenta, and the oxygenated blood returns through the umbilical vein of the fœtus.

2. *Nutrition.* The epithelial cells of the chorionic villi absorb nutriment from the fœtal blood and in doing so show a selective power.

3. *Excretion.* The epithelial cells of the chorionic villi also excrete waste products from the fœtus.

The fœtal membranes cover the fœtal surface of the placenta and pass from its edges to line the portion of the internal surface of the uterus not including the decidua serotina, but do not form a sheath to the cord, as formerly supposed. The cord is generally attached at or near the center of the placenta. The maternal surface is rough and divided by numerous sulci. After expulsion of the placenta, this surface is covered by the superficial or cellular layer of the decidua serotina, while its deeper layer remains attached to the wall of the uterus. Numerous small openings are found on it which are the apertures of veins torn off from the uterus.

Fig. 21.—Diagram of Placenta.

Structure and Formation of the Placenta. It is made up of two portions: a fœtal portion containing the hypertrophied villi of the chorion with their contained vessels, and a maternal portion containing the decidua serotina with its contained vessels. These two portions are intimately blended, forming the placenta which is expelled after the birth of the child.

It is formed in the following manner: The villi of the chorion penetrate the decidua serotina, forming large sinuses into which the villi enter. The intervening structures between the two sets of vessels are, to a large extent, but not altogether, absorbed.

There is never any direct communication between these two sets of vessels—i. e., the maternal and fœtal blood never mix. Between the maternal blood, coming directly from the lungs and fully oxygenated, and that of the fœtus which is carbonized, there is only a thin layer of tissue, composed of (*a*) the epithelium covering the surface of the villus, (*b*) the tissue of the villus itself, (*c*) the wall of the small branch of artery in the villus.

The epithelium covering the surface of the villi is partially, if not wholly, absorbed. Through this thin layer, or diaphragm, the two currents of blood interchange their gases and soluble substances by diffusion and osmosis. The carbon-dioxide gas from the fœtus passes into the maternal blood, while oxygen passes from the maternal blood into the fœtus.

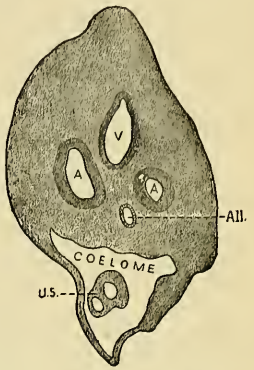


Fig. 22.—Section through Young Umbilical Cord (Minot).

A., artery; *All.*, allantois; *U.S.*, stalk of umbilical vesicle; *V.*, vein.

Umbilical Cord.—This is the channel of communication between the fœtus and the placenta, passing from the umbilicus to the center of the placenta (generally). It is generally 18 to 24 inches (46 to 61 cm.) long, but may be in exceptional cases 5 to 60 inches (13 to 152 cm.). At birth it is formed of an external layer derived from the skin of the embryo, two umbilical arteries, an umbilical vein, and the remains of the allantois embedded in a gelatinous substance called "Wharton's jelly." Early in fœtal life the vessels are straight, but soon become much twisted. The arteries are external to the vein and have no branches; the vein has no valves. The pedicle of the umbilical vesicle, which is present early in pregnancy, disappears. Sometimes a funnel-shaped diverticulum of the cœlome (a diverticulum of the abdominal peritonæum) persists into which coils of the intestine may pass and be strangulated during the ligature of the cord.

Appearance of the Fœtus at Different Months.—The following short description will indicate the development of the fœtus.

At the end of the *first* month the ovum is about $\frac{3}{4}$ inch (2 cm.) long, being about the size of a pigeon's egg. The embryo is about $\frac{1}{3}$ inch (1 cm.) long. The umbilical vesicle is smaller than

the embryo. The amnion is separated by a small interval from the chorion.

At the end of the *second* month the ovum is 2 inches (5 cm.) long, being about the size of a hen's egg. The amnion is distended

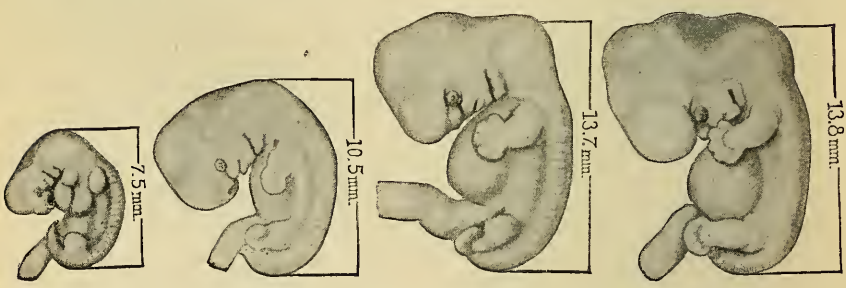


Fig. 23. Fig. 24. Fig. 25. Fig. 26.

Figs. 23–26.—Embryos from Fourth and Fifth Weeks (His). ×2.

and is in contact with the chorion. The villi of the chorion are more developed. The cord is straight.

At the end of the *third* month the ovum is 4 inches (10 cm.) long. The placenta is formed. The villi in the other portions of

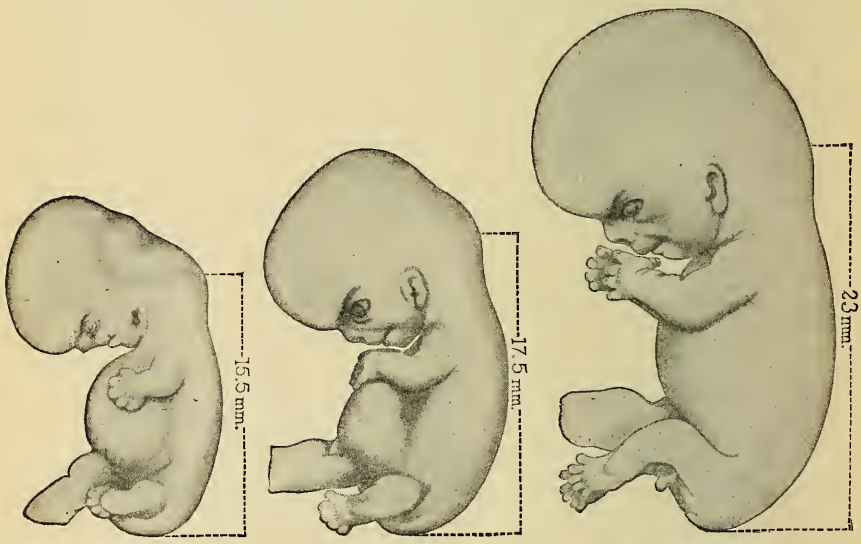


Fig. 27. Fig. 28. Fig. 29.

Figs. 27–29.—Embryos from Second Month (His). ×2.

the chorion have nearly disappeared. The cord is longer and slightly twisted. The limbs and head have developed.

At the end of the *fourth* month the fœtus is 6 inches (15 cm.) long and weighs 3 ounces (93 gm.); the sex is distinguishable.

Fig. 30. Fig. 31. Fig. 32. Fig. 33. Fig. 34

Figs. 30–34.—Composite of Fœtuses at Ages of Two, Three, Five, Seven and Nine Months respectively.

At the end of the *fifth* month the fœtus is 9 inches (23 cm.) long and weighs 11 ounces (342 gm.) There is hair on the head and lanugo or down covers the body. The fœtus when born may move, and such movements continue for some hours.

At the end of the *sixth* month the fœtus is 12 inches (30 cm.) long and weighs 24 ounces (746 gm.) The eyebrows and lashes are beginning to form. The fœtus born at this time may breathe feebly, but soon dies. A little meconium exists in large intestine.

At the end of the *seventh* month the fœtus is 15 inches (38 cm.) long and weighs 45 ounces (1,400 gm.). The eyelids are open. The child is viable. The face is wrinkled. One testicle generally is in the scrotum. The nails do not reach the tips of the fingers. The membrana pupillaris is absent.

At the end of the *eighth* month the fœtus is 17 inches (43 cm.) long and weighs 4½ pounds (2,200 gm.). The face is less wrinkled, owing to a greater deposit of subcutaneous fat. The fœtus may live.

At the end of the *ninth* month (full term), the fœtus is 21 inches (53 cm.) long and weighs 7 pounds (3,470 gm.). The finger nails project beyond the tips of the fingers. It is covered with the

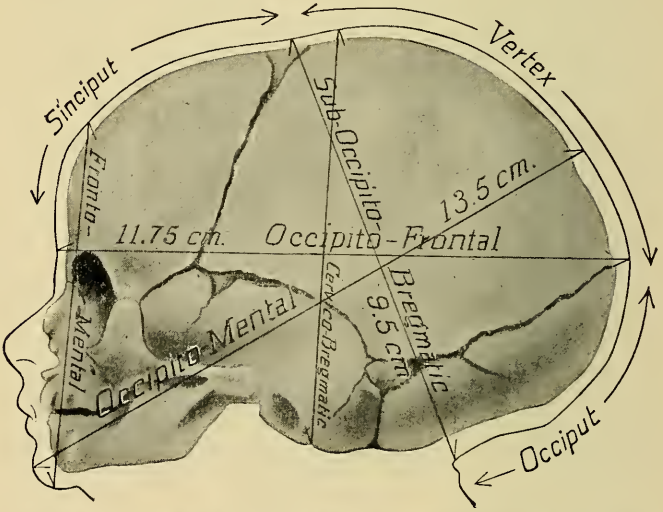


Fig. 35.—Child's Head at Term. ×⅔. (American Text-Book.)

vernix caseosa, a greasy material formed of epithelial scales and the secretion of the sebaceous glands.

The fœtus at full term presents some very important characteristics, differing in some respects from the adult.

The Fœtal Head.—The bones of the skull, particularly at the vertex, are but loosely joined together by membrane allowing the head to be molded, to a certain extent, in passing through the mother's pelvis. The sutures are merely membranous septa between the separate bones. They are as follows: the sagittal suture unites the two parietal bones; the frontal unites the two portions of the frontal bone and is continuous with the sagittal suture; the coronal unites the frontal and the parietal bones and extends from the squamous portion of the temporal bone across the head; the lambdoidal unites the occipital and the parietal bones.

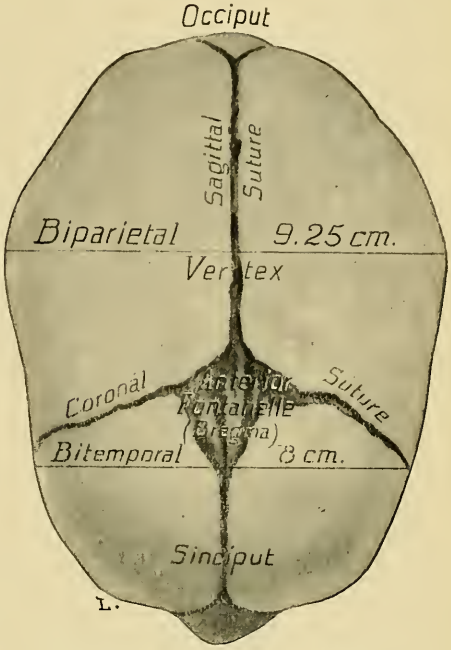


Fig. 36.—Child's Head at Term. ×⅔. (American Text-Book.)

Fontanelles. In two places there are membranous interspaces where the sutures join each other; these are called *fontanelles*. One, the anterior fontanelle, is larger and lozenge-shaped; it is formed at the junction of the frontal, sagittal, and coronal sutures. The other, the posterior fontanelle, is smaller and triangular; it is formed at the junction of the sagittal suture with the two arms of the lambdoidal suture.

Diameters. A knowledge of the diameters of the fœtal skull is of great importance. They are as follows: The *occipito-mental*, from the occipital protuberance to the point of the chin, 5¼ to 5½ inches (13 cm.); the *occipito-frontal*, from the occipital protuberance to the center of the forehead, 4½ inches to 5 inches (12 cm.); the *suboccipito-bregmatic*, from a point midway between the occipital protuberance and the margin of the foramen magnum to the center of the anterior fontanelle, 4 inches (10 cm.); the *cervico-*

bregmatic, from the anterior margin of the foramen magnum to the center of the anterior fontanelle, 4 inches (10 cm.); the *biparietal* or *transverse*, between the parietal protuberances, 4 inches (10 cm.); the *fronto-mental*, between the apex of the forehead and chin, 3½ inches (9 cm.). These diameters may be altered by compression and molding during labor.

Fœtal Circulation.—The chief difference between the course of the blood in the fœtus and that in the adult is that in the former there is no pulmonary circulation. The umbilical vein, bringing blood from the placenta to the fœtus, after entering the umbilicus sends two branches to the liver joining the divisions of the portal vein, while the main trunk, called the ductus venosus, empties into the inferior vena cava. The blood from the liver also empties through the hepatic vein into the inferior vena cava. The pure blood from the placenta is thus mixed with the blood coming through the inferior vena cava from the lower extremities.

The inferior vena cava empties the blood into the right auricle. From the right auricle the blood is directed by the Eustachian valve through the foramen ovale into the left auricle;—from the left auricle into the left ventricle; from the left ventricle into the aorta.

The greater portion of the blood passes through the branches of the aortic arch to the head and upper extremities. From these the blood returns by the descending vena cava to the right auricle; from the right auricle to the beginning of the pulmonary arteries; thence into the ductus arteriosus; thence into the descending aorta; thence a portion into the lower extremity which returns by the ascending vena cava; and a larger portion passes along the umbilical arteries to the placenta.

Changes after Birth.—The current through the umbilical vessels ceases, the portion of cord retained drying up and falling off; the umbilical arteries inside the abdomen, that is, the fœtal hypogastric arteries, become permanent in a part of their course, constituting the superior vesical arteries; the ductus venosus and the ductus arteriosus shrivel into fibrous cords; the foramen ovale closes; the lungs expand; the blood which formerly went through the ductus arteriosus now passes through the pulmonary arteries to the lungs; the blood from the lungs returns by the pulmonary veins to the left auricle; from the left auricle it passes into the left ventricle; from the left ventricle it passes into the aorta and is distributed to the head, trunk, and extremities.

Fig. 37.—Fœtal Circulation.

Fig. 38.—Circulation after Birth.

Fœtal Liver and its Functions.—It is large proportionately, and assumes its characteristic structure and secretes bile about the fifth month; it helps to form sugar, which is abundant in the fœtus. The bile is partly collected in the gall-bladder and subsequently passes into the intestinal canal. Here it mixes with the intestinal mucous secretions, forming the meconium—a thick tenacious greenish substance which is voided in considerable quantities soon after birth.

Urine.—A certain amount is formed during intrauterine life, some of which may be voided into the amniotic cavity. (This is denied by some.)

Nervous System.—The nervous system is developed to some extent, perhaps sufficiently to allow reflex action. The gray matter of the brain is quite rudimentary in new-born babes.

CHAPTER IV

PREGNANCY

FŒTUS IN UTERO

Relations.—The following terms are used in connection with the relations of the fœtus in the uterus: *attitude, position, lie, presentation.*

Attitude refers to the relations of different parts of the fœtus to each other.

Position refers to the relation of a given surface of the fœtus to the anterior, lateral, or posterior aspects of the mother.

Lie refers to the relation of the long axis of the child to that of the mother.

Presentation refers to the part of the child felt most prominently in vaginal examination.

There is a certain confusion about the two terms, *lie* and *presentation.* For instance, when the head is downward we are said by many to have a head presentation. This ought, in the opinion of some, to be called a head lie. The term head presentation is, however, more commonly used. Presentation, strictly speaking, means the part of the child which is first touched by the examining finger while it is passing through the parturient canal. As expressed by Matthews Duncan, the term presentation means that point on the surface of the child's head through which the axis of the fully developed pelvic canal passes, or, as it is expressed more simply by Tyler Smith, the part which is felt most prominently within the circle of the os uteri, the vagina, and the ostium vaginæ in the successive stages of labor.

CHANGES IN THE MATERNAL ORGANISM

Size of Uterus.—The uterus is greatly increased in size. It increases from 1 ounce (31 gm.) in weight and $2\frac{1}{2}$ inches (6 cm.) in length to 24 ounces (746 gm.) in weight and 12 inches (30 cm.) in length. Before the third month the enlargement is chiefly in

the lateral direction. After the third month it is more in a vertical direction. At the end of the third month the fundus uteri is on a level with the pelvic brim. At the end of the fourth month it is 2 inches (5 cm.) above the symphysis pubis. At the end of the fifth month it is half-way between the pubis and the umbilicus. At the end of the sixth month it is on a level with the umbilicus. At the end of the seventh month it is half-way between the umbilicus and the ensiform cartilage. At the end of the eighth month it is near the ensiform cartilage. At the end of the ninth month it sinks a little in the abdomen (about the last three weeks in primiparæ and the last week in multiparæ). (Fig. 48.)

Fig. 39.—Pregnancy (Five Weeks). (Tor. Univ. Museum.)

The uterine walls become hypertrophied, but, at the same time, somewhat softened. The enlargement takes place chiefly in the body of the uterus, while the cervix is very little, if at all, enlarged. The increase in the size of the uterus corresponds to some extent to that of the fœtus, but such increase is really a growth and not due to distention. In fact, the uterine cavity in early pregnancy increases in size faster than the ovum, while, at the same time, the walls become thicker. At a later stage of pregnancy the ovum completely fills the cavity of the uterus, although there is but little or no pressure produced upon it as long as the uterine walls remain relaxed.

One of the most remarkable things in this connection is the fact that in an ectopic gestation the uterus goes on increasing in size up to the fourth month or longer while the fructified egg is growing in the tube.

Lower Uterine Segment.—This portion of the uterine body, which is situated immediately above the internal os, deserves careful consideration. It is thinner and less vascular than the rest of the body. There is a well-marked ring between the lower and upper segment of the uterus which has received many names, as follows: ring of Bandl, contraction ring, retraction ring, and retraction ring of Schroeder.

Cervix.—The cervical canal remains intact until about the end of pregnancy. It was formerly supposed that during the latter part of pregnancy the internal os was drawn up to a level above the symphysis and that the part of the cervix thus drawn up was dilated in such a way that it became, practically, a part of the uterine cavity which contained the ovum. We now believe that there is no enlargement of the internal os until labor has commenced or is about to commence. A certain amount of confusion has arisen because there is an apparent shortening of the cervix. The cervix is really not shortened in the ordinary sense of the word. The erroneous impression that such shortening exists is probably due to the fact (as explained by Dakin) that the uterus passes down in the pelvis until some of the weight rests on the pelvic floor at a spot on the posterior vaginal wall and that the cervix is thus compressed. It is usually bent so that the external os looks forward in the axis of the vagina. The second reason is that there is a downward bulge of the anterior uterine wall just above the cervix.

Fig. 40. — Pregnancy Two Months Advanced, showing Embryo, Membranes and Villi of Chorion. (Tor. Univ. Museum.)

The softening of the cervix, which occurs early in pregnancy, is due to œdema from congestion on account of the pressure of the uterus on the veins. It generally begins about the end of the first or early in the second month and can be readily detected in most cases, but especially in primiparæ. It should be remembered in this connection that a similar condition, that of softening of the

cervix, may be produced by the presence of fibroid or other tumors. The late Dr. Goodell, of Philadelphia, attached a good deal of importance to this sign, and said that in the unimpregnated uterus the cervix on being touched by the finger felt about as hard as the end of the nose, while in the impregnated uterus it felt about as soft as the surface of the lips.

The cervical canal contains a plug which has been called by some the operculum. Considerable interest is attached to this plug, inasmuch as it forms a barrier which, under ordinary circumstances, prevents pathogenic germs from passing into the uterine cavity during pregnancy. Reference is also made to the operculum in the chapter on Puerperal Infection.

Fig. 41.—Pregnancy Three Months, showing Fœtus Below, Cord, and Placenta forming on Right Side Above. (Tor. Univ. Museum.)

Broad Ligaments and Peritonæum.—As the fundus uteri rises in the abdominal cavity the broad ligaments are carried with it so that the edge, instead of being nearly horizontal, after a time becomes almost vertical; at the same time the fundus of the uterus becomes much elevated above the level of the two cornua. About the end of pregnancy the tubes appear to join the uterus about midway between the fundus and the internal os (see Fig. 84).

The peritonæum is probably to some extent stripped from the bladder. The central part of the lower portion of Douglas's *cul-de-sac* does not appear to be raised during pregnancy. There is some hypertrophy of the round ligaments and also of the muscle-fiber in the broad ligaments. The increase in the round ligaments is so great that they can often be felt through the ab-

dominal walls at the latter part of pregnancy, the left being more readily felt on account of dextrorotation of the uterus, which brings the left side forward. The ovaries are lifted slightly above the pelvic brim and are brought closer to the side of the uterus on account of the growth of the latter between the layers of the broad ligament.

Fig. 42.—Five Months Pregnancy. Placenta with Sac containing Fœtus attached. (Tor. Univ. Museum.)

Decidua.—The mucosa during labor consists of three layers: compact, spongy, and deep. The compact layer is superficial and has decidual cells lying between the glands, which are much dilated with epithelium flattened and degenerated. The spongy or middle layer has glands widely dilated with spindle cells and fibers of connective tissue between them. The deep layer is thin and dense and consists of connective tissue containing blind ends of glands whose epithelium is unchanged. It is closely attached to the muscular wall.

The separation of the decidua at abortion or full-time parturition occurs through the spongy layer, the dilated glands acting like the row of perforations between two postage stamps and allowing separation to occur easily. After the separation of the decidua the mucosa is renewed, and covered by the epithelium of the blind ends of the glands which remain attached to the muscular wall (Fothergill). This is again referred to in the chapter on Abortion.

Circulatory System.—It was formerly supposed that the blood in pregnancy was increased in quantity and also changed in character. It was thought that it became more watery and contained

more fibrin and white corpuscles, and at the same time fewer red corpuscles and less albumin.

It has been clearly demonstrated, however, in recent years that no important changes occur in the blood during pregnancy. The slight increase in the number of the white blood corpuscles, or leucocytosis, which occurs during the last few days of pregnancy, but especially during the first week of the puerperium, is referred to in another chapter. It is also thought by many recent observ-

Fig. 43.—Full Term Pregnancy; Fœtus in Sac, Membranes partially Detached from Edge of Placenta. (Tor. Univ. Museum.)

ers that the amount of hæmoglobin and red corpuscles is actually increased in the latter part of pregnancy.

Nervous System.—The irritability of the nerve centers becomes increased. It is likely that the changes which take place in the

nervous system are entirely functional. This is the general rule, to which, however, there are some exceptions. In certain cases changes appear which are serious in character and can scarcely be called functional, as, for instance, mental disorders, chorea, and other affections showing more or less loss of regulating power.

Respiratory System.—The breathing becomes more thoracic and sometimes embarrassed. This is due to the fact that the uterus, as it rises in the abdominal cavity, presses against the diaphragm

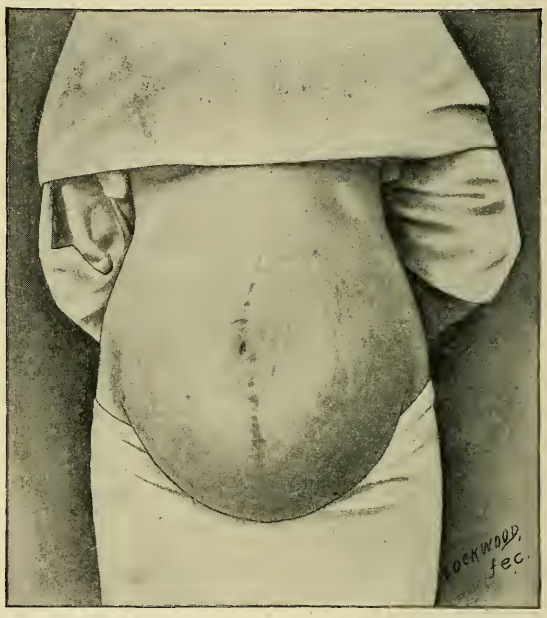


Fig. 44.—Pendulous Abdomen of a Multiparous Woman with Normal Pelvis, showing also Old and New Striæ (Williams).

and thus diminishes the thoracic space. Some say, however, that this space is not much diminished, because as the diaphragm presses upward the thorax widens to a slight extent at its base. Some contend that the vital capacity of the chest is only slightly, if at all, diminished. I am not sure whether this statement is correct, but we know from clinical experience that in certain patients, especially in those who have a tendency toward bronchitis or asthma, or both, there is a certain amount of embarrassment of the breathing apparatus, which is caused by the changed conditions which prevail in pregnancy.

Osseous System.—Osteophytes or irregular bony deposits are frequently found between the skull and dura mater. These, however, are not peculiar to pregnancy and are not important.

Urinary System.—The urine is greater in quantity, possibly from increased arterial pressure, and is more watery. The specific gravity is about 1.014. Albumin and sugar are found in a certain proportion of cases without giving rise to serious symptoms.

Cutaneous System.—Many changes take place in the skin during pregnancy. Pigmentation occurs in certain parts of the body, especially in the breasts, where the areola becomes much darker in color, and in the abdomen, where a similar change takes place in the linea alba. This deposit of pigment is more marked in brunettes than in blondes. Sometimes the skin of the face shows deposits of pigment as irregular patches on the forehead and the neck (chloasma). There is also increased activity of the glands of the skin, especially the sebaceous and sweat-glands. Sometimes the enlargement of the glands may cause lumps, particularly in the skin of the axilla; such lumps should not be confounded with supernumerary breasts which sometimes appear in the same position.

Where the skin is much stretched, as, for instance, on the surface of the abdomen, certain markings are found. These are due to cracks in the skin, which are called striæ, lineæ albicantes, or lineæ gravidarum. They are due to changes in the corium caused by stretching, and they lie at right angles to the direction of the stretching. The epidermis covering the cracks does not show any change in structure. The striæ are mostly oblique in direction, running downward and inward. The color of these cracks is at first gray or pinkish and sometimes a bluish purple. These lines sometimes grow whiter and more opaque after labor. If small striæ are formed in subsequent pregnancy, the difference between the old and the new is quite easily recognized (Fig. 44).

Alimentary System.—Although disturbances of the digestive organs are apt to arise, it is not likely that in healthy women assimilation is often seriously affected. However, it happens in a certain proportion of cases that evil effects arise on account of defective assimilation, such as osteomalacia, acute atrophy of the liver, general toxæmia, etc., which will be considered in connection with the diseases of pregnancy.

Bladder.—The bladder is affected, to some extent, on account of the pressure of the anteverted gravid uterus. Under ordinary circumstances the position of the uterus early in pregnancy is largely affected by the condition of the bladder (full or empty). As pregnancy advances, however, the uterus ceases to be affected by the bladder and the conditions are reversed; that is, the bladder has to adapt itself to the space available for it. The bladder is especially pressed upon during the first three months of pregnancy. After the uterus rises above the brim there is for some months more room for the bladder in the pelvis. In the last couple of months, however, the lower part of the uterus again occupies a good deal of space within the pelvis and the bladder is then much pressed upon. Under such circumstances the bladder frequently rises above the pubes in such a way that it lies between the anterior abdominal wall and the uterus. It happens that there is no fixed rule about the position of the bladder in the latter part of pregnancy, and on this account it is often quite difficult to pass a catheter at this time. Howard Kelly says the female bladder expands physiologically like saddle-bags, most from side to side and least in an antero-posterior direction, and this method of distention becomes more marked in pregnancy.

Intestines.—Intestinal peristalsis is generally impaired during pregnancy. It is especially important to consider the condition of the rectum. The pressure on the rectum is apt to produce constipation, sometimes of an obstinate form. Another very common and serious condition is that of piles, which is produced by pressure on the pelvic veins. In a fairly large proportion of cases hæmorrhoids appear during the first pregnancy for the first time, and sometimes require careful and judicious treatment.

DIAGNOSIS OF PREGNANCY

In a great majority of cases pregnant women make their own diagnosis, and engage the accoucheur to attend them during labor. The physician when called on to decide as to the condition will get little credit for making a correct diagnosis, while, on the other hand, he will be seriously blamed for a mistaken diagnosis. It is very important in certain instances that no mistake be made, especially where the reputation of the patient is at stake.

It is sometimes exceedingly difficult, if not impossible, to make a correct diagnosis. Under such circumstances it is better to wait for a time and perhaps make repeated examinations before giving a definite opinion. Mistakes in the diagnosis of pregnancy happen to be somewhat frequent and occur even in the hands of very careful practitioners.

A few years ago a man of large experience examined a patient and made a diagnosis of ovarian tumor. He decided to operate and made all the necessary arrangements. It was discovered, however, when the woman was placed on the table for operation, that she was pregnant, nearly at full term. In other cases which might be narrated the mistake was not detected until the abdomen had been opened.

About a year ago a patient was sent to a surgeon of this city to be operated upon for a supposed ovarian tumor. As there was considerable obscurity about the condition present I was called in consultation. We examined the patient very carefully under chloroform and formed the opinion that there was a pregnancy advanced about six months and that the fœtus was dead. The patient denied the possibility of such a condition and her relatives were seriously offended. We were allowed shortly afterward, however, to empty the uterus, and found a dead fœtus six months advanced. In such a case one assumes a serious responsibility in giving a decided opinion, especially when, as in this instance, the patient is an unmarried girl. It is important in such a case to get one or more consultants to share the responsibility.

A patient herself will sometimes make the error of considering that she is pregnant when no such condition exists, and this not unfrequently happens even with women who have previously borne children. Further references to such mistakes are made in connection with the Differential Diagnosis of Pregnancy.

SIGNS AND SYMPTOMS

The ordinary signs of pregnancy have been classified in various ways. By some they are divided into the probable, or symptomatic signs depending upon changes taking place in the maternal organism, and the physical or direct signs produced by the growth of the uterus and the ovum. The simplest plan is to consider the signs pretty much in the order in which they occur.

Cessation of Menstruation.—The suppression of menstruation, or the amenorrhœa of pregnancy, is in many respects the most important sign, because it is the first which leads a woman to suspect that she is pregnant. It is not a certain sign. Irregular hæmorrhages taking place during pregnancy from various causes are frequently mistaken for menstruation. In other instances it is possible for genuine menstruation to occur during early pregnancy, that is, during the first three months, while there is still a space between the decidua vera and the decidua reflexa. We hear of cases in which menstruation has been supposed to occur during the whole of pregnancy. There may be hæmorrhages at any time during pregnancy, and they may occur with a certain amount of regularity, but they are not menstrual discharges when they occur during the fourth and later months.

Suppression of menstruation, even in the healthy, may occur from various emotional and other causes. Such temporary cessations of menstruation without pregnancy are especially apt to occur shortly after marriage or after illicit intercourse.

The occurrence of pregnancy during the amenorrhœa of lactation is not at all uncommon. Many women while nursing their children become pregnant and have no suspicion of any such condition until they feel the motion of the child within the uterus—that is, quickening.

Morning Sickness. Nausea and vomiting are common in pregnant women, and as the sickness occurs more frequently in the morning it has received the name of morning sickness. There may be simple nausea with no other disturbance, or there may be nausea accompanied by retching, or there may be nausea accompanied by more or less vomiting.

These symptoms commonly occur about the end of the first month, and are generally relieved or mitigated at the end of the fourth or fifth month. They may, however, occur almost immediately after conception and continue through the whole of pregnancy; on the other hand, they may be absent altogether. It happens in a certain proportion of cases that the nausea and vomiting become so serious as to require careful treatment.

Changes in the Breast and Nipples.—The mammary changes are especially important in those pregnant for the first time. They sometimes occur very early, in which case there may be from the very onset of pregnancy a sense of fulness and tenderness in the

breasts. In the second month a distinct enlargement of the breasts may be apparent, and such enlargement is more manifest as pregnancy advances. As the enlargement takes place chiefly in the glandular tissue the breast has a knotty feeling; in the latter months the large blue veins may be distinctly visible under the skin. Changes in the nipples and the areolæ are still more pronounced. The nipples generally become more prominent and are often covered with minute branny scales due to the drying of the secretion which oozes from them. A secondary areola may be visible during and after the fifth month and its presence affords a strong presumption of pregnancy. In the latter part of pregnancy the breasts droop to a certain extent, causing the nipples to become directed downward, and thus better adapted for the infant to seize.

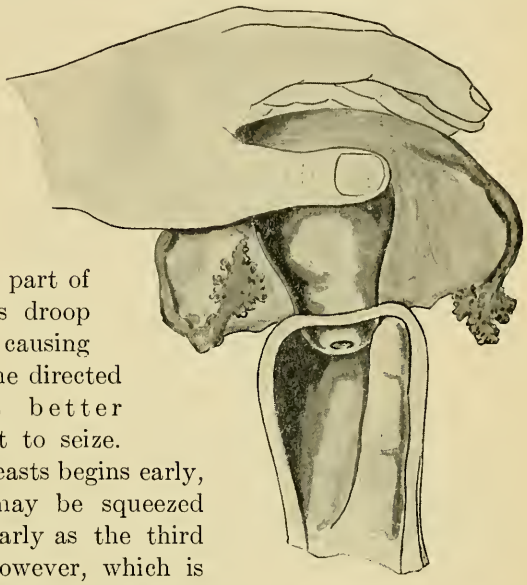


Fig. 45.—Bimanual Examination showing no Enlargement of the Uterus.

Secretion in the breasts begins early, and a clear liquid may be squeezed from the nipple as early as the third month. The fluid, however, which is formed in the gland early in pregnancy is not milk, but a mucoid fluid which is quite clear and transparent. After a time microscopical examination reveals colostrum corpuscles which are similar to those found in the breast secretion immediately after delivery. Changes in the breast similar to those described may occur with various uterine and ovarian disorders and in those cases of imaginary pregnancy called pseudocyesis.

Changes in Size, Shape, and Consistency of the Uterus.—The uterus commences to enlarge shortly after fecundation of the egg. The increase in the size of the body is chiefly in the antero-posterior diameter during the first few weeks, changing the pear shape of

the uterus into that of an "old-fashioned fat-bellied jug" (Parvin). This "bellying" of the uterine body can generally be detected in front of and above the cervix by one or two fingers in the vagina, while the uterus is pushed downward by the other hand. The body of the uterus also becomes soft, doughy, and elastic. This change in consistency can generally be detected on bimanual examination.

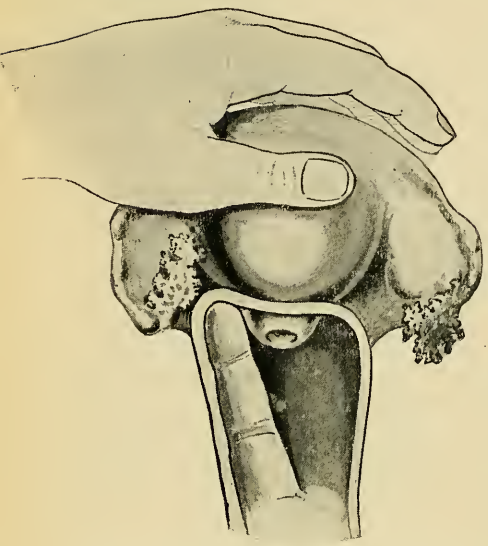


Fig. 46.—Bimanual Examination showing "Bellying" of Uterus.

Hagar's sign appears early in pregnancy, about the sixth week, and depends on the softening of the lower uterine segment, which gives the impression to one making a combined examination that the body and the cervix of the uterus are disconnected. One or two fingers are passed into the vagina, or the thumb is passed into the vagina and a finger into the rectum, while the fundus is pressed down by the other hand from above. A great deal of importance is attached to this sign by many, but it does not always point to pregnancy. This softened condition of the lower uterine segment may sometimes be found in the non-pregnant uterus, being caused by congestion or inflammation produced by tumors, etc.

Softening of the Cervix and Enlargement of the Os.—The cervix begins to soften in its texture during the first month of pregnancy, owing to the congestion and the effusion of serum into its substance. In the latter part of pregnancy the softening is sometimes so extreme that a beginner may find it difficult to distinguish the cervix from the vagina. The softening is superficial in the first month, is more marked by the fourth month, and reaches its extreme extent in the seventh or eighth month.

The cervical glands secrete a larger amount of mucus during pregnancy than under ordinary circumstances. It is this tena-

cious mucus which forms the cervical plug or operculum. The external os becomes more patulous than it was before impregnation. In most cases the finger may be easily introduced within the os during the last three months of pregnancy in multiparæ, but not in primiparæ.

Changes in the Vagina.—The changes in the color of the vaginal mucous membrane from normal to a dark purplish appear early in pregnancy and are due to venous congestion. The vaginal walls become thickened and are thrown into folds which sometimes protrude slightly from the vaginal orifice. The laxity of the mucous

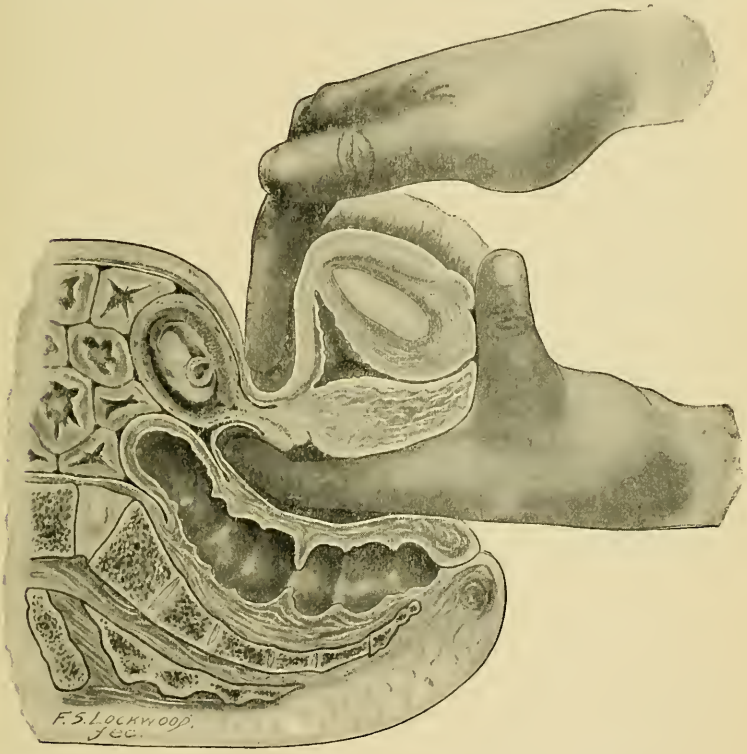


FIG. 47.—METHOD OF DETECTING HEGAR'S SIGN (Williams).

membrane is well marked after the sixth month and there is also a secretion of mucus.

Hypertrophy of the Ureters.—Palpate back of the symphysis with finger in the vagina and then starting above at one side of the

joint draw the finger downward and slightly outward along the back of the pubes. Jellett says that the ureter, which here lies back of the pubes between the anterior vaginal and the posterior bladder wall, is displaced forward against the pubes and is felt to slip from under the finger. It is not easy to distinguish whether it is enlarged or not, but Jellett adds that if it is felt at all by the student it is probably hypertrophied, because it is difficult to feel a non-hypertrophied ureter.

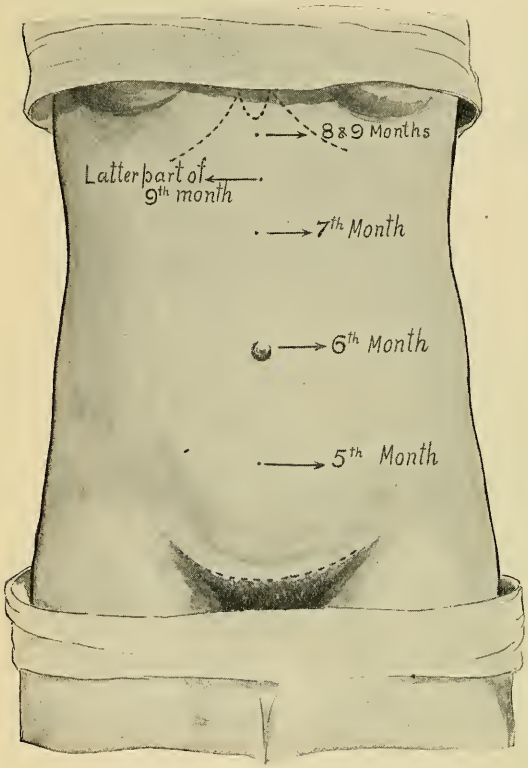


FIG. 48.—HEIGHT OF FUNDUS UTERI.

Five months, between symphysis pubis and umbilicus; six months, at umbilicus; seven months, half-way between umbilicus and ensiform cartilage; eight and nine months, near ensiform cartilage, sinking in latter part of ninth month.

Ballottement.—This word is derived from *balloter*, to toss up like a ball. It means the sensation imparted to the fingers when they are placed beneath the fœtus as it lies in the body of the uterus and is tossed up in the liquor amnii. The woman is placed on her back, or in a position midway between sitting and lying. As Galabin describes it, the finger in the vagina with its tip resting just in front of the cervix should give a sudden but gentle push or jerk upward. The fœtus is then felt to recede from the finger and after a moment's interval to return with a gentle tap. The physician may not be able to feel the return tap, but if he feels the hard body (the fœtus) recede and finds after a moment or two that it has

returned to its former position he may consider that he has obtained the characteristic evidence furnished by this sign.

Fœtal Movements.—The movements of the fœtus are usually felt by the mother when pregnancy is about four and one-half months advanced, but the time of such occurrence is very variable. This sensation of movement which the mother notices is called quickening, and is first noticed when the uterus rises sufficiently into the abdomen to come in contact with the abdominal walls. The fœtal movements become more evident and much stronger as pregnancy advances and may often be seen as well as felt during the later months.

Quickening is of much importance in certain cases where it furnishes to the woman the first sign of pregnancy. Recognition of fœtal movements by abdominal palpation proves to us not only that pregnancy exists, but also that the fœtus is living. This is often of great importance when the fœtal heart sounds can not be heard. The subjective sign of quickening—that is, the feeling of fœtal movements by the mother, should not be considered in any case a positive sign of pregnancy. Even women who have before borne children may be deceived and may mistake intestinal movements for those of the fœtus, as, for instance, in cases of pseudocyesis. It is sometimes difficult even for the physician to be certain of fœtal movements which may be simulated by movements of the intestines or of the abdominal muscles.

Fœtal Heart Sounds.—By auscultation over the abdomen of a pregnant woman several different sounds can be heard. The following are mentioned by Smyly: fœtal heart sounds, uterine souffle, funic or umbilical souffle, maternal heart sounds, respiratory murmur of the mother, movements of the child, friction between the uterus and the abdominal wall, crepitating noises due to air in the uterus or abdominal walls, the muscular susurrus—that is, the note given out by contracting muscle-fiber.

The fœtal heart sounds are said to resemble the ticking of a watch beneath a pillow, but it is better for one to learn them by listening to the heart of a young infant soon after birth. The sound is really double, but in a large proportion of cases only the first can be heard. The rate varies between 120 and 160 in the minute. It is much affected by accidental circumstances. Active fœtal movements sometimes increase the rapidity to the extent of twenty beats in the minute. The condition of the mother often affects

the rate. When the rate of the mother's pulse is increased by fever or other causes the fœtal pulse may also be increased, although not in a proportionate degree. During a labor pain the fœtal heart becomes slower and resumes its ordinary rate during the interval between the pains. In a tedious labor, if the vitality of the fœtus is lowered by long continued pressure, the fœtal heart rate becomes slower. In such a case the fœtal heart often becomes slower while the mother's pulse is becoming more rapid. Diminished rapidity of the fœtal pulse is often an indication of danger to the child's life.

The fœtal heart sounds are acknowledged by all to furnish the most valuable sign of pregnancy. A recognition of such sounds proves beyond a doubt that a living fœtus exists. After we have discovered the evidence of a living fœtus the only doubt that can arise is due to the possibility of an extra-uterine instead of a uterine pregnancy.

The fœtal heart is most frequently heard at a point half-way between the umbilicus and the center of Poupart's ligament on the left side. This is because the sounds are best transmitted, as a rule, through the back of the fœtus and when the fœtus is in the first or most common position, with its back directed toward the left front of the mother's abdomen. In the second position, when the back of the child is directed toward the right front of the mother's abdomen, the sound is of course best heard on the right side. In face presentation the heart sounds are heard better through the thorax than through the back. In other cases when the back of the fœtus is lying posteriorly the fœtal heart is heard with difficulty or not at all.

The only mistake which is likely to arise is that due to hearing the mother's pulse instead of the fœtal heart. Generally speaking, one can easily distinguish between them by comparing the rate of the pulse of the mother with that of the fœtus. Sometimes when the woman's pulse is rapid there may be some difficulty. However, even in that case, if one listens with the stethoscope and feels the radial artery at the same time, it will be found that the two pulses will not continue simultaneous for any length of time, one is sure to be slower than the other in time.

It is thought by some that the pulse rate may be of some value in distinguishing the sex. If, for instance, the fœtal pulse is 140 or more it is likely that there is a female child; if it falls below

140 it is likely to be a male child. However, when we remember that the rapidity of the heart varies in the same children at different times and that it depends largely on the size of the child, we can easily see that the sign is not of much importance.

Uterine Souffle.—The uterine souffle is a blowing sound synchronous with the mother's pulse, generally heard on one or both sides of the body of the uterus, but most frequently in the left flank. The sound has been compared to the puffing of an engine of a goods train going slowly and heard from a distance. It was at one time called the placental souffle, because it was thought that it had its origin in the placenta. That this is not the case is proved by the fact that it may be heard for some time after delivery and also that a similar sound may be heard in some cases of uterine tumors. The sound is produced in the large arteries which come from the broad ligaments and enter the uterine walls.

The sound is first heard about the end of the fourth month and continues until the time of labor and for a certain time into the puerperium. In the earlier months one may hear it by placing the stethoscope close above the pubes on either side. As a sign of pregnancy it is sometimes especially valuable, since it may be heard before the fœtal heart sounds, and, although it may occasionally be heard when uterine tumors are present, we know that such tumors are rarely associated with amenorrhea. We also know that tumors no larger than a fœtus five months old seldom produce a souffle.

The souffle in the pregnant uterus varies more in quality, pitch, and tone than that produced from the presence of tumors. In fact, the souffle in pregnancy is said to be more or less musical, and is sometimes composed of several notes which form a sort of chord in the rhythmic contractions which constantly take place during pregnancy.

Intermittent Uterine Contractions.—Gentle, painless contractions of the uterine walls take place at regular intervals during the whole of pregnancy. Each contraction produces a tense condition lasting for a minute or two, or about as long as a regular labor pain. Each contraction is followed by a relaxation lasting about ten to fifteen minutes. These contractions and relaxations may be detected as soon as the uterus rises from the pelvic cavity and comes in contact with the abdominal wall, and become more distinct as pregnancy advances. During the intervals of relaxation the fœtus

can generally be felt through the uterine walls, which are then quite flaccid. During the contraction the fœtus can not be so distinctly felt. The uterus becomes more pyriform in shape and more prominent in front. Although uterine contractions may be caused by the presence of certain tumors they are not so distinct in the latter case as when they are caused by pregnancy.

Funic or Umbilical Souffle.—The umbilical souffle is a murmur which is produced in the vessels of the cord, probably the umbilical vein, and is synchronous with the fœtal pulse. The murmur is generally produced in the cord at some point where it is subjected to pressure or twisted. It may be heard toward the end of pregnancy in about 10 per cent. of cases. This murmur is of very little practical importance.

Other Sounds.—Some other sounds of no great importance may sometimes be heard. Among these are the sounds produced by the movements of the child or by friction between the uterine and abdominal walls. Certain crepitating sounds, due to the presence of air in the uterus, may also occasionally be heard.

DIFFERENTIAL DIAGNOSIS OF PREGNANCY

The following conditions may be mistaken for pregnancy: (1) Those which increase the size of the uterus; physometra, hydrometra, hæmatometra, uterine fibroids. (2) Those which increase the size of the abdomen from growths, etc., outside the uterus; ovarian tumors, enlarged organs and malignant tumors within the abdomen, ascites, accumulation of fat in abdominal walls or omentum, spurious or false pregnancy.

Physometra.—This is a collection of gas in the uterus frequently due to the decomposition of fragments of the ovum. If large enough for percussion a tympanitic sound will show the nature of the enlargement, while at the same time palpation and auscultation will not furnish the ordinary sign of pregnancy. The most common cause is atresia or some form of stenosis.

Hydrometra.—This is a collection of watery fluid which is retained on account of occlusion of the os. As in the case of physometra the increase in the size of the uterus is slow. The uterus is seldom found to be larger than an orange. It generally appears in women who have passed the menopause.

Hæmatometra.—This is an accumulation of menstrual blood in the uterus which is due to either congenital or acquired atresia of some portion of the genital canal. Such atresia may be readily detected by physical examination. Errors of diagnosis due to such accumulations are unfortunately not very rare. In studying the history of the enlargement of the uterus in such cases we generally find that it has lasted for a long period and that it has increased periodically rather than continuously. The rapid increase which occurs periodically is generally attended by severe pain and usually occurs once a month. The uterus is found on palpation to be tense and resisting, not elastic and yielding as it generally is in pregnancy. On palpation also no fœtal parts are felt and auscultation furnishes none of the ordinary sounds caused by pregnancy.

Uterine Fibroids.—These tumors, more properly termed myomata, are not infrequently mistaken for pregnancy. When the uterus is enlarged on account of the presence of fibroids, it is generally irregular in shape and hard and resisting instead of elastic and yielding. There is usually metrorrhagia (irregular and profuse hæmorrhage) instead of amenorrhœa.

Ovarian Tumors.—Menstruation is generally present with ovarian tumor, but amenorrhœa is occasionally produced. Under such circumstances the cessation of menstruation comes on gradually. In ovarian tumors there are no heart sounds and no fœtal movements. The enlargement is generally observed on one side of the abdomen rather than in the median line and its development is slower than that of pregnancy. When a patient has an ovarian tumor there is generally marked deterioration of health with emaciation, the latter being especially noticeable in the face.

Enlarged Organs and Malignant Omental and Mesenteric Growths.—Certain organs within the abdominal cavity which become enlarged from any cause may be mistaken for a pregnant uterus. Such enlarged organs, however, develop from above downward, and can generally be mapped out by percussion. We get the dulness above the line of the lower edge and a resonant strip below. Misplaced organs, like the kidney and spleen, may generally be pushed upward. Malignant tumors of the omentum and mesenteric glands are lumpy and fixed, and nearly always grow more slowly than a pregnant uterus.

Ascites.—Enlargement of the abdomen, caused by a collection of fluid within the abdominal cavity, has sometimes been mistaken for a pregnant uterus. A differential diagnosis, however, of the two conditions is a comparatively easy matter. In addition to the ordinary signs of ascites the uterus is unchanged in form, size, and position, while menstruation is generally uninterrupted and the ordinary reflex disturbances of pregnancy are absent. There is also, generally, an obvious cause for the ascites, usually disease of the liver, kidneys, or heart.

Accumulation of Fat in the Abdominal Wall or Omentum.—There is very frequently a marked and rapid increase in the size of the abdomen, especially in women forty to fifty years of age, which is due to the accumulation of fat in the abdominal wall or in the omentum. In such cases the abdominal wall becomes not only prominent but pendant, and the woman has, as Dr. Bailey expressed it, "a double chin in the belly." There is an entire absence of the ordinary signs of pregnancy as discovered by auscultation and abdominal palpation. It is generally easy when the patient is lying down for one who places a hand on each side of the abdomen to include between the hands the mass of fat and partially lift it up, thus showing its true character.

Pseudocyesis or False Pregnancy.—This singular condition is said by some to occur in women who have married late in life, especially when they are very anxious to have children. We, however, find it in women who have borne children, especially in those who have had a number of children in early married life with a considerable interval before the menopause. In some of these cases abdominal enlargement may exist, menstruation may cease, the breasts may become large and painful and contain milk, the ordinary signs of stomach derangement may be present, and generally the patient is positive that she can feel the movements of the fœtus. It may go on so far as to be followed by what is called spurious labor. In such cases the patient feels certain that she has ordinary labor pains. We know that these supposed symptoms are due to some perversity of the nervous system, and yet the ætiology is to a certain extent obscure. In most cases the women are perfectly honest in their belief and have no desire to deceive others.

In such cases the physician who makes no special inquiries or examination, but trusts entirely to the statements of his patient,

may easily be deceived. In attempting to make a diagnosis he should attach little or no weight to the subjective signs of pregnancy. A careful examination will generally enable him to find the true condition of affairs. If, after making an examination in the ordinary way, there is still some doubt as to the condition, it is well to have an anæsthetic administered. Anæsthesia makes the diagnosis a very simple matter. I have, however, seen two patients in whom for certain reasons there was some difficulty in arriving at a correct diagnosis. In one instance the patient was so positive that pregnancy existed that she would scarcely submit to anything like a proper examination. It is sometimes an exceedingly difficult matter, as well as a very thankless task, to convince a woman under such circumstances that she is mistaken. I know another case where the doctor made a very casual examination, asked a few questions, and predicted that labor would come on a certain date. A nurse was brought from a neighboring town and kept for a month in the house waiting for the labor which never came. In this case both the doctor and patient were greatly humiliated.

Pregnancy combined with Fibroid or other Tumors.—Myomata, ovarian tumors, malignant tumors, ascites, and enlarged abdominal organs may coexist with pregnancy. This is especially the case in reference to uterine fibroids and ovarian tumors. When one or more of these conditions coexist with pregnancy there is sometimes great difficulty in making an accurate diagnosis and in deciding as to the best form of treatment.

DURATION OF PREGNANCY

There are certain reasons which prevent us from determining the exact date of conception. The only date that we can be certain about which we have to reckon from is that of the last menstruation. Those who have studied carefully the statistics of the subject tell us that the average duration of pregnancy is from 271 to 276 days. The question of the duration of pregnancy derives its chief interest in certain cases from medico-legal considerations. Sometimes the courts have to decide as to the legitimacy of a child that has been born at an interval longer than usual after the last possible date of coitus with the husband. In England and

America there is no absolute limit laid down, and each case has to be judged on its own merits. In America the legitimacy has been allowed after intervals of 313 to 317 days. The laws of Scotland, Austria, and France allow a possible limit of 300 days, while those of Prussia allow one of 302 days.

As intimated before, we can arrive at a more definite conclusion as to when pregnancy will terminate, or when labor will commence, by considering the date of the commencement of the last menstrual period. In the great majority of cases the ovum which escaped at the last menstruation is the one impregnated, and labor is most apt to occur at the time when the patient ought to menstruate. If, then, we add to the date of the first day of the last occurring menstruation ten lunar months, or 280 days, we should get the probable date of the commencement of labor. A common method is to add nine calendar months to (or what amounts to the same, subtract three calendar months from) the date of the first day of the last menstruation and add seven days to the date thus found. For instance, if the last menstruation commenced on May 10th, the day nine calendar months from that would be February 10th. The addition of seven will give the probable date of delivery, February 17th. Or we may take the date of the commencement of the last menstruation and count from that 280 days. Such calculation should indicate the date of expected labor. Most tables are founded on this method of calculation.

In certain cases we can not rely on the date of menstruation at all, for instance, when conception takes place during a period of amenorrhœa or when irregular hæmorrhages take place during the early part of pregnancy. In some cases we have to rely to some extent on the time of quickening. As quickening generally takes place about the middle of pregnancy, we may form some idea of the time of expected labor by adding four and one-half months to the date when quickening was first felt.

There are two other methods by which we may get some idea and perhaps a pretty definite one as to how far pregnancy has advanced.

1. *By Determining the Size of the Uterus.* We can get a fair idea of the size of the uterus by a bimanual examination during the early part of pregnancy, before the fundus has reached the level of the brim of the pelvis. Such an examination will enable us to decide approximately how far pregnancy has advanced.

After the fundus passes above the level of the brim we can ascertain the height of the uterus by external examination. (Fig. 48.)

2. *Length of Fœtal Ovoid.* This is said by some to give the most reliable data. In trying to discover the length of the fœtal ovoid one should first make out that the fœtus is in its normal attitude of flexion. One arm of a pair of calipers is then introduced into the vagina, and the end is placed on the lowest point of the child's head felt through the anterior vaginal wall; the other is then introduced over the highest point of the breech on the abdominal wall. According to Dakin the following numbers will then be a guide as to measurements thus obtained:

Weeks	26	28	30	32	34	36	38	40
Length in inches.	7.2	7.6	7.9	8.3	8.8	9.2	9.5	9.7

DIAGNOSIS OF PREVIOUS PREGNANCY

In some cases it may be important from a medico-legal point of view to know whether a woman is pregnant for the first time, or whether there has been a previous pregnancy which has gone on to full term. In the woman pregnant for the first time the abdominal wall is generally smooth, tense, and resisting, so that it can not be easily depressed; while in succeeding pregnancies the skin of the abdominal wall is not smooth but relaxed. In first pregnancies the uterus is more apt to be confined to the vicinity of the median line and does not incline to the front so much as it does in succeeding pregnancies. In first pregnancies the mammary glands are generally round and firm instead of being relaxed, flabby, and pendant. The vulvar orifice is small and closed and the posterior commissure is complete. The vagina is comparatively small and the neck of the uterus is conical, its closed orifice showing a uniform rim or border. As mentioned, however, by Parvin, it has been observed by Kleinwatcher that all these signs have only a relative value. The striæ upon the abdomen and breasts and the tears of the cervix may be wanting, the perinæum may be entire, and yet the patient may have been pregnant. The signs of a previous pregnancy are chiefly the results of mechanical force produced by carrying and giving birth to a large fœtus. They may, therefore, be in part or entirely absent, provided the first labor was premature and the fœtus too small to produce any

injury from distention or tears. It should also be remembered that abdominal striæ may be due to great abdominal distention from ascites or the presence of an ovarian tumor. If several years elapse between two labors the soft parts may be so nearly restored to their original condition that it will be impossible to decide whether the person is a multipara or a primipara.

PELVIMETRY

This means the process of measuring the pelvis. We have passed through various phases of thought in connection with deformities of the pelvis and a proper estimate of them by correct pelvimetry. Many were inclined years ago to think that pelvic deformity, while comparatively common in the older countries, was very rare in America. It was, of course, always understood that we occasionally met with a generally contracted or a flat pelvis through which it was impossible to extract an ordinary child, but it was somewhat easy to recognize such a pelvis in the dwarf, the humpback, etc. We tried to do our duty by making use of pelvimetry to a certain extent. Unfortunately, the subject was greatly obscured by the multiplicity of methods described.

We found that "complete" pelvimetry was a very tedious procedure involving great exposure of the patient and much manipulation, all of which were very distasteful to her. It was not the custom in private practice in England to carry out such measurements. It was not often attempted even in hospital practice. In recent years pelvimetry has become common in most of the British lying-in hospitals, but not in private practice. On the Continent, and especially in France and Germany, routine pelvimetry has been carried out in hospitals and to a certain extent in private practice for some time. A few years ago such men as Parvin and Lusk in the United States described the French and German methods of pelvimetry, but expressed the opinion that pelvic deformity was very rare among native-born women. So far as I know, Whitridge Williams was the first in that country to properly carry out routine pelvimetry. He was thus enabled to demonstrate the fact that the proportion of women with contracted pelves in the United States was much greater than had

previously been supposed by Parvin, Lusk, and others. Williams and Robbins found in 1,000 consecutive cases of labor 130 contracted pelves, that is to say, about 13 per cent.

Methods.—Since we have carried out routine pelvimetry in the public wards of the Burnside Lying-in Hospital, we have discovered a fairly large proportion of pelvic deformities. We have endeavored to simplify our methods as much as possible, and, as a result, have been able to carry out pelvimetry in a satisfactory way. We always take three external measurements, using a modified pair of calipers, as Bandelocque's or Schultze's pelvimeter, as follows:

1. The *interspinous*—between the anterior superior spines of the ilia—normal 25 cm. (10 in.).

2. The *intercristal*—between most widely separated points of crests of the ilia—normal 28 cm. (11 in.).

3. The *external conjugate*—between the anterior surface of the symphysis pubis and the depression below the spinous process of the last lumbar vertebra—normal 20 cm. (8 in.).

If these measurements are abnormal the following are taken:

4. The *interischial*—between the tuberosities of the ischia—normal 10 cm. (4 in.).

5. *Pubo-sacral*—between the pubes and the sacro-coccygeal articulation—normal 12 cm. (5 in.).

6. *Diagonal conjugate*—between the lower edge of the symphysis and the promontory of the sacrum—normal 12 cm. (5 in.).

Pelvimetry pertains especially to pregnancy, and should always be practised as a matter of routine by every physician during pregnancy. Herman tells us that the pelvis can be measured more easily and more exactly after delivery than at any other time, and says that on that account the pelvis should be measured after a difficult labor, in order that the patient might be rightly advised and treated in subsequent pregnancies and labors. This is quite right, but it is infinitely more important to have the measurements made before than after the difficult labor.

DESCRIPTION OF PELVIMETRY

In taking external measurements Bandelocque's pelvimeter or some modification of it is used. I have for some years used Schultze's instrument and think there is none better. It has firm

arms and is more portable than most pelvimeters. When closed it occupies very little space in the satchel.

The patient lies on her back, preferably on a hard table covered with a folded blanket, with her hips as near the edge as possible.

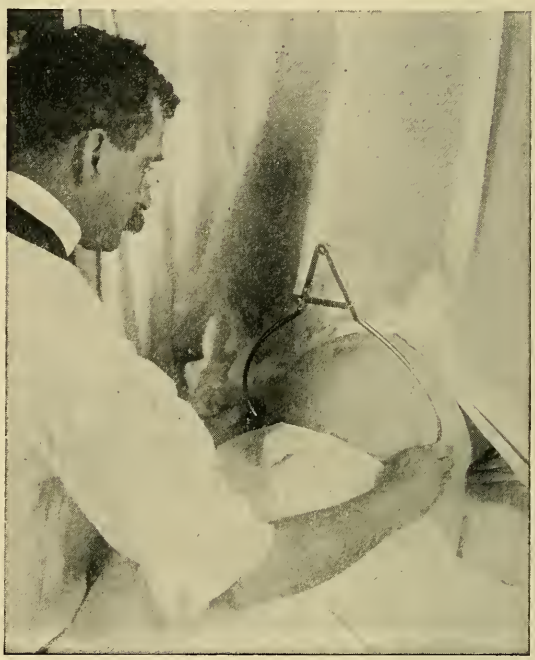


Fig. 49.—Pelvimetry; Inter-Spinous Measurement.

If she is especially sensitive as to exposure she may be covered with a thin sheet. One can, however, examine more satisfactorily without the sheet, and the exposure required for the first three external measurements is so slight that few will object to it. The head and shoulders are slightly elevated and the knees partially flexed. The physician stands beside the patient (preferably the right side) with his face toward her head. It is better to have an assistant, not necessarily a skilled one, to hold one or both points of the instrument when required.

Interspinous Measurement.—In taking the interspinous measurement the points of the two arms of the pelvimeter are placed on the spines external to the insertion of the sartorius muscle. It is sometimes difficult to get these points. According to the

German method the points of the two arms should first be placed outside the iliac crests and then moved forward until it is considered they have reached the anterior end of the crests—that is, the external surface of the spines. Another method adopted by Herman and others in England is to press the thumbs against the inner surface of each spine so that the points of the caliper shall not move inward beyond the spine. It is easier for beginners to place the thumbs in these positions and allow the assistant to place the points on the bone just outside the thumbs. These two methods give slightly different results, the measurement according

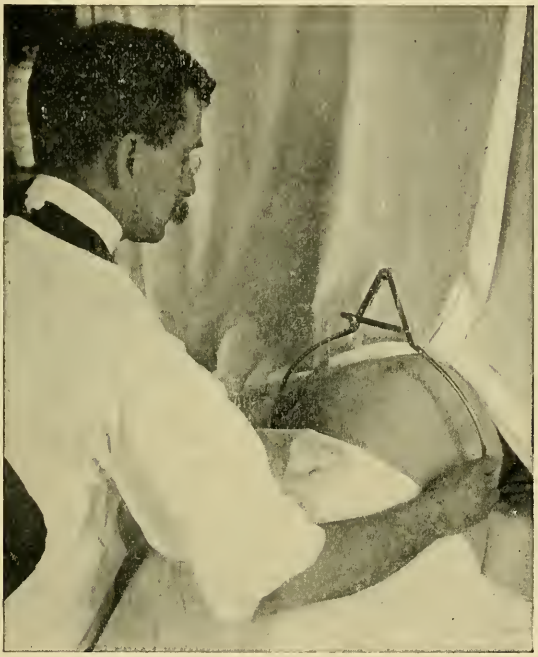


Fig. 50.—Pelvimetry; Inter-Cristal Measurement.

to the German method being, on an average, from 1 to 2 cm. more than that by the other. The average by the German method is about 26 cm.

Intercristal Measurement.—In taking the intercristal measurement the points of the arms are placed on those portions of the iliac crests which lie farthest apart. Generally it is quite easy to find the portions of the crest farthest distant from each other. The

average is 28 cm. In certain kinds of deformed pelves, however, which are probably always rhachitic in character, the measurements between the spines are equal to, or greater than, those in any portion of the crests. In such cases measurement is made from the two spots on the crests which are situated 6 cm. posterior to the spinous processes.

External-Conjugate Measurement.—In taking the external conjugate the patient is turned on her side, one extremity of the pelvimeter is placed upon the fossa just beneath the spinous process of the last lumbar vertebra and an assistant holds it in posi-

Fig. 51.—Pelvimetry; Antero-Posterior Measurement.

tion; the other extremity is placed upon the anterior surface of the symphysis pubis about 1 cm. from the upper border. It is not always easy to find this depression beneath the last lumbar vertebra. Generally, however, with care it can be found by following down the spines of the lumbar vertebra and feeling a little hole below which no spinous process can be found. If there is doubt a horizontal line is taken between the highest points of the iliac crests; the last lumbar spine lies about 4 cm. below this. Or, another horizontal line is taken between the posterior superior iliac spines; the last lumbar spine lies about 2.5 cm. above this. The average measurement is 20 cm. From this measurement is deducted 9 cm.; the difference, 11 cm., will be, approximately, the measurement of the true conjugate diameter. If the external conjugate is less than 17 cm. it is certain that the true conjugate

diameter is abnormally short; but the external measurement does not necessarily indicate the amount of shortening of the true conjugate. When the external conjugate is more than 17 cm. we can not be certain that there is not shortening of the true conjugate. However, a great majority of deformities included under the term of flat pelvis may be discovered by this measurement, and the great majority of universally contracted pelves may be discovered by the three measurements combined.

These are the three measurements that are taken as a matter of routine in all patients in the Burnside as before mentioned, and they are the three measurements which should be taken in private practise. If there is no special deviation from the normal nothing further is done; if, however, there is reason to believe from these measurements that there is shortening of the transverse, or the antero-posterior diameter, or both, further measurements are taken. These cause more exposure of the patient, the most important requiring a vaginal examination. If, for instance, there is reason to suspect the existence of a short conjugate diameter a vaginal examination should be considered absolutely necessary.

For internal measurements the best pelvimeter is the hand of the accoucheur. In taking these measurements the patient is placed in a lithotomy position with the nates slightly beyond the edge of the table. The index and middle fingers of the left hand are introduced into the vagina, the posterior vaginal wall is pushed well backward, the elbow is sunk, and the fingers are pushed almost directly upward. If there is any shortening of the true conjugate it is generally quite easy to reach the promontory of the sacrum. It is sometimes possible to reach the promontory by this method even in normal pelves. If one is not able to reach the promontory with the tips of the fingers he may decide that there is no shortening—that is, that he has not a flat or generally contracted pelvis to deal with.

The measurement is taken by pressing the middle finger firmly against the most easily reached portion of the promontory, while the radial edge of the hand, or index finger, is raised to the subpubic ligament. The point of contact with the latter is then marked with the nail of the index finger of the right hand. The distance from the mark of the nail to the tip of the finger is measured with a small rule or a pelvimeter. A certain amount is deducted from this to obtain the length of the conjugata vera.

One can not tell exactly how much, as the amount will depend on the height and inclination of the symphysis pubis and on the degree of elevation of the promontory above the symphysis. A safe rule, however, is to deduct from 1.5 cm. to 2 cm. This will leave 10 to 10.5 cm. as the true conjugate diameter.

Additional Measurements.—The three external measurements already described, together with the internal measurement here referred to, are practically all one requires to take even in doubtful cases. Sometimes, however, it is desirable to get some information as to the outlet. For such a purpose it will be well to take the following measurements:

Inter-ischial or Transverse Diameter at the Outlet. With the patient still in the lithotomy position the thumbs are placed upon the skin over the ischial tuberosities; the palmar surfaces of the thumb are pressed against the inner aspect of the tuberosities at the level of the line running through the anterior margin of the anus. An assistant then measures the distance between the two points. The beginner is very apt to make this measurement about 2 or 3 cm. too short, on account of the thickness of soft tissue covering the tuberosities.

Pubo-sacral Measurement. The end of the second finger is placed against the sacro-iliac articulation and the radial edge of the hand is brought in contact with the subpubic ligament, the point at which the latter rests against the hand is marked by a finger of the other hand. On withdrawing the hand the distance between this point and the finger-end is measured. This measurement should be about 12 cm. The consideration of other measurements, such as those between the trochanters, the external oblique measurements, those between the posterior superior spines, and others, is omitted, because of their relatively small importance.

Much information can be obtained by introducing the whole hand into the vagina, with the patient thoroughly anæsthetized, especially after difficult labors. For instance, we may get a pretty exact knowledge as to the true conjugate diameter by ascertaining whether the forefingers or the palm of the hand, or the closed fist with thumb flexed across the hand, or flattened against the forefinger, or to some extent extended, will pass between the promontory of the sacrum and the pubic bones. The part of the hand which is used in taking the measurements is across the narrowest part of the brim and not lying obliquely to it.

HYGIENE AND MANAGEMENT OF PREGNANCY

Pure air is especially necessary, because the patient "breathes for two." Her chamber should be well ventilated and should contain as few extras in the way of heavy window curtains and bed curtains as possible.

Clothing.—Woolen garments should be worn next to the skin. Combination suits (shirt and drawers in one) are the most suitable. Corsets, belts, and tight garters should be discarded. Skirts should be suspended from the shoulders. For house wear wrappers are most suitable.

Diet.—No great change from the ordinary diet is required. The patient should take plain food and omit all rich foods, pastries, hashes, stews, and fancy dishes, and should also take plenty of fluids, especially water.

Constipation should always receive treatment sufficient to overcome it. If regulation of diet with plenty of water be not sufficient to relieve the constipation, cathartics, such as Hunyadi water, aloes, salines, or cascara sagrada should be taken. Cascara sagrada with maltine is a good mild cathartic and is useful in many cases.

Mammary Glands.—These should, as a rule, be left alone. Retracted nipples are apt to cause much trouble, but endeavors to pull them out during pregnancy probably do more harm than good. Efforts to harden nipples by bathing with alcoholic solutions and the like are bad, because after such treatment they are more apt to crack than if they are left alone. If some application seems advisable it is safe to use something which will soften them or keep them soft, such as lanolin, or castor oil and bismuth combined, equal parts. Efforts to draw out depressed or inverted nipples are dangerous, because they usually cause irritation.

Exercise.—A fair amount of exercise should be encouraged, but such exercise should as a rule be somewhat less than the ordinary. The patient should avoid fatigue, jars, strains, overreaching, and lifting heavy weights. Sexual indulgence is more or less dangerous.

Abdominal Bandage.—In a large proportion of cases pregnant women should wear a belly-band or supporting corsets after the middle of pregnancy. (Dührssen says every woman should do so.)

Importance of Examination.—The importance of pelvimetry during pregnancy has been mentioned and its methods have been

described. Too much credit can not be given to Dr. Whitridge Williams, not only for what he has done in pointing out the amount of pelvic deformity which exists in the New as well as the Old World, but also for the practical turn he has given to the subject. It is now generally recognized, mainly through his teachings, that an examination of the patient before labor should be a matter of routine on the part of the accoucheur.

In considering present opinions as to the management of pregnancy it is interesting to note three distinct features in what may be called progressive evolution during the last thirty years:

First. Great importance was attached to the condition of the kidneys, and especially albuminuria.

Second. A broader view of the subject was taken, and more importance was attached to general toxæmia, of which albuminuria is only one of many symptoms.

Third. Great importance was attached to the dimensions of the pelvis and to many conditions of pregnancy which may be discovered by inspection, pelvimetry, and palpation.

Although these matters are discussed in various succeeding chapters, a few brief rules are here given as to certain points in connection with the management of pregnancy.

Physicians should carefully watch for and treat any abnormal conditions which may arise, such as disorders of digestion, headaches, disorders of vision, swelling of the feet and legs, albuminuria, etc., with a view of preventing general toxæmia. They should also frequently examine the urine, to discover especially the amount of urea excreted and albuminuria and glycosuria when present. It is better to adopt some system with reference to the urinary examinations. One should, of course, be guided to a considerable extent by circumstances as they arise, but it is well to carry out some rules, such as the following:

The urine should be examined once a month from the end of the fifth to the end of the eighth month, and once a week or once a fortnight during the ninth month.

A preliminary examination should be made in the eighth month of pregnancy, about six weeks before the expected date of labor. As suggested by Williams, and, as I have found preferable, such examination should be made with the patient in bed in her own home. The first part of the examination is an inspection, so far as one can make it, to detect gross deformities of pelvis, hips, and

back, and abnormal lies of the fœtus. The next part is external pelvimetry, and then internal pelvimetry in the small proportion of cases in which it is required. After pelvimetry the abdomen should be carefully examined by external palpation.

The Patient's Outfit.—The physician should make careful inquiries and give definite directions as to articles required before labor. The patient usually has her outfit at least partially prepared at this time. I have found it advisable to give a definite

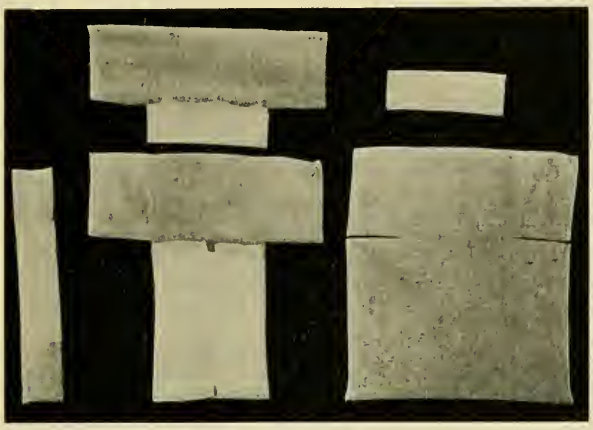


Fig 52.

On right side, above, the "guard," made of a piece of butter-cloth eight inches square folded twice, placed over vulva; below, piece of butter-cloth twenty-one by eighteen inches; seven inches from end (one-third whole length). Cut inward on each side five inches. In center, below, absorbent cotton placed on cloth and edges folded over it; above, part containing absorbent cotton folded twice. On left side, portion containing absorbent turned over twice; pad complete, to be placed over guard.

list of things needed, and have lately used a modification of that recommended by Cooke, as follows:

Four abdominal binders, $1\frac{1}{4}$ yards long by $\frac{1}{2}$ yard wide, made of the cheapest grade of unbleached muslin. This muslin comes in a width of one yard, and $3\frac{3}{4}$ yards are required to make the necessary number of binders. They should be torn the proper size and the selvage torn off, but it is not desirable to have them hemmed or finished in any other way. They should be washed and ironed to make them soft and comfortable. The cheapest grade of muslin is recommended, because the more expensive and

consequently the heavier quality does not take the pins well and is stiff and uncomfortable when in use.

Two obstetrical pads, each twenty inches square, made of cheesecloth stuffed with cotton batting (not absorbent cotton) until they are three or four inches thick. They should then be tacked or tufted sufficiently to keep the cotton from slipping, and are to be placed under the patient's buttocks during the first stage of labor. When practicable it is well to have them sterilized before use, but this is not absolutely necessary if the pads are made with clean hands from new material, as should always be the case.

Two and one-half dozen sanitary or vulvar pads (Snively pattern). The vulvar pad is made from a piece of butter-cloth 21 inches square. This is doubled, and a cut made extending inward 6 inches, which will leave 7 inches of cloth at one end and 14 inches at the other. Before folding, a layer of absorbent cotton, 14 inches long and 7 inches wide, is placed in the center, and over this the butter-cloth is folded from either side. The next step is to double the part containing the absorbent cotton, then double again, and over this fold one-half of the piece at the top, which will be 3½ inches in width, and completely envelops the pad, leaving a stub at each end, which can be slipped under the binder and pinned to keep it in position. The patient should know how to make these pads. As soon as they are made they are to be done up in packages of six, and each package wrapped separately in a clean towel or in clean white muslin and laid away in a convenient place, free from dust, until wanted.

One dozen clean towels, preferably old soft ones without fringe. These are to be pinned up in another clean towel, and laid away with the other things. They are for use only about the patient, and are not for the hands of the physician or nurse. If a sterilizer is available they should be sterilized, but this is not indispensable.

Safety pins. Two papers of large and one of small in addition to those required for preparing the bed.

Absorbent cotton. One-half pound. *Lysol*, four ounces, and bichloride tablets. *Two pieces of mackintosh or rubber sheeting.*

One slop jar or pail made perfectly clean to be used during labor for receiving soiled sponges, towels, and the like, as well as any solutions or discharges that can be directed into it.

A good supply of clean towels (in addition to the dozen already mentioned), sheets, pillow cases, and nightgowns for the patient.

CHAPTER V

PHYSIOLOGY OF LABOR

Labor is the process by which the fœtus and its appendages are expelled from the body of the mother. It is generally recognized that there are three factors in this process: 1, the expelling powers; 2, the body to be expelled, the passenger; 3, the canal through which it passes, the passage.

Cause of Labor.—Many discussions have taken place and many theories have been advanced as to the determining cause of labor with results so barren as to be practically worthless. The cause is unknown.

THE EXPELLING POWERS

Uterine Contractions.—The uterine contractions are the most important of the expelling powers. The painless contractions of the uterus which are present during the whole of pregnancy, gradually gain in force during the later weeks until labor commences, when the patient becomes conscious of them. These contractions are then accompanied by pains which become the prominent symptoms. These true pains (as they are sometimes called) generally begin in the back and pass around the body to the neighborhood of the pubes or down the thighs. They are intermittent and come on at regular intervals. We may say, approximately, that the intervals are about thirty minutes at the beginning and lessen in length as labor advances. Near the end of the expulsive efforts the intervals do not usually exceed one, two or three minutes, and sometimes they disappear, causing the pain or the uterine contraction to be practically continuous. The last strong contractions are called "bearing down pains" by the laity. The duration of a pain is about a minute. This is nearly the average time, but it varies from about half a minute to one or two minutes until the final pain, which may last four or five min-

utes. It not infrequently happens that for hours the labor progresses very slowly, when suddenly, without any apparent cause, the pains or contractions become strong and long-continued and the child is expelled in a few minutes, instead of one or more hours as one might have expected. Such vagaries in connection with uterine contractions and their results add much to the perplexities of midwifery practise.

The Value of the Intermittent Character of the Pains.—When the contractions cease to be intermittent, there is a condition called tetanic contraction of the uterus. This tetanic contraction stops the circulation in the uterine sinuses and in the placenta, and shuts off the oxygen supply from the blood of the fœtus. As a result the fœtus sometimes dies in a comparatively short time. The tetanic spasm also causes in the mother extreme pain, great exhaustion, sometimes rupture of the uterus, sometimes death.

While the pains or uterine contractions are intermittent the temporary impediments to the circulation during the pains disappear during the intervals between the pains, and no harm comes to the fœtus or mother.

The Action of the Abdominal Muscles.—The uterine contractions cause the dilatation of the lower segment of the uterus. When this dilatation has been completed, or nearly so, the action of the uterus is reenforced by certain auxiliary muscles. There are two sets of such muscles, namely, the abdominal muscles and the muscles of the pelvis. At the height of the uterine contraction the woman generally holds her breath, the diaphragm becomes fixed and the contracting abdominal muscles press upon the uterus. In consequence of these various forces the child is impelled in the direction of least resistance—that is, downward through the dilated cervix. Generally, the contractions of the abdominal muscles are under control of the will, but toward the close of the second stage they become more or less involuntary on account of the reflex factor of painful distention of the passage. The uterus may, however, expel its contents without any assistance from the abdominal muscles.

The pelvic floor is at first, to a certain extent, an obstacle to the progress of labor, but on the eve of expulsion it helps to push the head forward in the direction of the outlet; the muscles of the vaginal wall will take some part in such expulsion. These forces

also form an important element in the expulsion of the after-coming head in breech cases, and in the expulsion of the placenta.

Influence of the Nervous System.—There are certain motor centers which have more or less influence in regulating the uterine contractions. There are probably three such centers, one in the medulla, one in the lumbar spinal cord, and a third lying on the posterior vaginal fornix and intimately connected with the uterus. We are not sure that parturition is altogether a reflex act, but it is chiefly so; the ordinary labor pains are probably reflex acts. We do not know what the stimulus is early in the first stage of labor. At a certain time the contractions which were previously painless become painful; at the same time there is probably some relaxation of the sphincter fibers at the lower end of the body of the uterus which permits the amnion, with its inclosed fluid, to pass slightly within the internal os. This causes some irritation of the nerve endings in consequence of which certain stimuli are carried to the nerve center which is supposed to be in the lumbar portion of the spinal cord. From this center the stimuli are reflected to the muscular fibers of the uterus, causing those of the fundus and upper segment to contract, while those of the lower segment and cervix slightly relax. We make use of our knowledge of such reflex acts when we wish to induce labor.

Definition of Terms used in Connection with Uterine Contractions.—It is a matter of great importance to have a clear conception of certain facts in connection with Bandl's ring. It divides the body of the uterus into two portions, which are not only different from an anatomical and physiological point of view, but are affected differently by the various forces in action during labor. The ring gradually ascends during labor. At the same time the two segments are changed; the one becomes thicker and shorter, and the other becomes thinner and longer. These are the main prominent facts which one can easily understand. Frequent references are made to these facts especially in connection with tedious labor, dry labor, prolapse of the cord, placenta prævia, rupture of the uterus, expulsion of the placenta, etc.

The following possible result furnishes an example of the importance of these different forces. The upper segment of the wall pulling on the lower is getting stronger, thicker, and shorter. The lower segment was the weaker at the commencement of labor, and when stretched in this way is likely to get still weaker. Such a

process as that can not go on indefinitely with safety. The portion that is being stretched, thinned, and weakened may give way. This sometimes happens, causing rupture of the uterus.

There is a certain amount of confusion respecting some terms used in this connection.

Dakin says: "Contraction means a shortening of the muscular fiber which, when relaxation follows, returns to its original condition and shape." A large number, if not most physiologists, give a similar definition of contraction.

Horrocks says: "When a muscle contracts it is unable of itself to return to its former condition. Some other muscle or force is

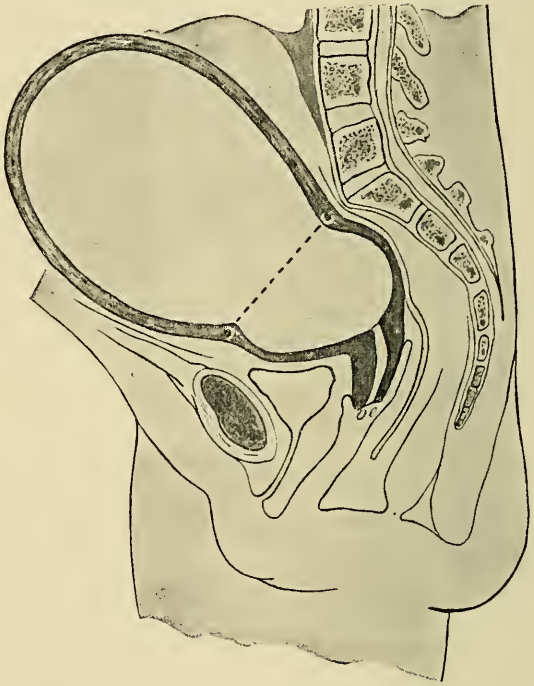


Fig. 53.—Section of Pregnant Uterus before Retraction.

required to pull it out or extend it." When a muscle contracts and then relaxes it is in a condition called "retraction."

Galabin says: "Retraction means the contraction and shortening of the uterine muscle not followed by relaxation."

These quotations are from the writings of three eminent obstetricians of London.

It may make things a little more clear in considering the three terms, contraction, relaxation, and retraction, to state that in connection with various processes of labor there is, normally, no such

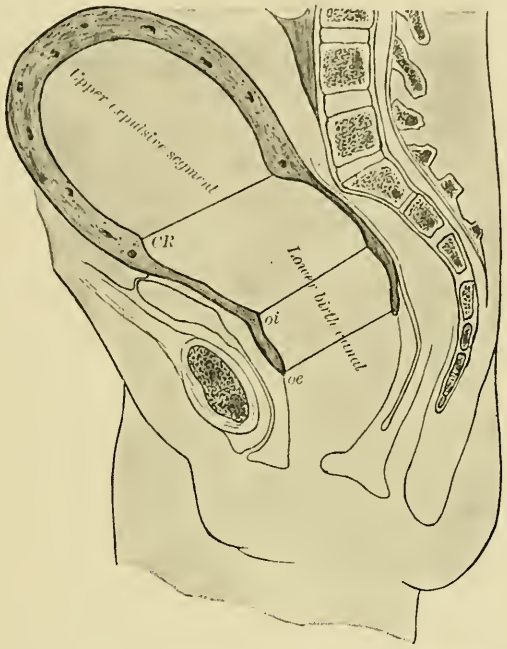


Fig. 54.—Section of Pregnant Uterus after Retraction.

thing as complete relaxation at any time. A muscle may contract slightly or completely (so far as strength or nerve energy will permit), but in a living, healthy body it probably can never completely relax. If the muscular fibers become completely relaxed after labor there could be no such thing as tone or retraction. There would be nothing to prevent a woman from rapidly bleeding to death.

It may be considered, therefore, that *relaxation*, when referred to by physiologists or obstetricians, always means partial relaxation.

Contraction of a muscular fiber is the power to alter its condition so as to actively pull on its attachments and thus bring them,

or tend to bring them, nearer together. A muscle may contract, however, without shortening.

Retraction is the condition of the muscle which is produced by partial relaxation after active contraction (see Figs. 53, 54). Partial relaxation means that the contraction of the muscular fiber has become less active and complete.

The Law of Polarity.—When a muscle contracts its opponent relaxes. When the flexors of the forearm contract the extensors relax; when the extensors contract the flexors relax. When the circular fibers of the iris contract the radiating fibers relax, and the result is that the pupil gets smaller; when the radiating fibers contract the circular fibers relax and the pupil dilates. In the case of the hollow organs, such as the bladder, heart, uterus, etc., the pressure of the contents of these cavities acts as an opponent to the contracting fibers. As the bladder becomes filled the *detrusor* fibers tend to drive the contents out through the urethra. At a certain time, during the act of contraction of these fibers, the sphincter relaxes, allowing the urine to be voided. Similarly the upper and lower portion of the uterus are opposed to each other. The muscular fibers of the lower segment and the cervix uteri form, practically, a kind of sphincter muscle. While the upper fibers contract these sphincter fibers relax, and the result is that they are stretched by the pressure brought to bear on the amnion with its liquor amnii.

I am, to a large extent, using Horrock's explanation of polarity. He goes on to say that one of the commonest mistakes made by students, when asked to state the law of polarity, is to say that when the body and fundus of the uterus actively contract the lower zone and cervix actively dilate. It is true they are often dilated, but not unless there is something to dilate them. The law is that when the body and fundus contract the lower zone and cervix uteri partially relax, and hence while in this state of partial relaxation they are capable of easy extension, that is, dilatation by an extending force, such as that exerted by the pressure of the bag of membranes; in other words, they do not actively dilate, but are passively dilated.

Elasticity.—This is a property which, according to Matthews Duncan, is chiefly possessed by the peritoneal coat. It means the power of a body to shrink into its original dimensions after a force expanding it is withdrawn. The peritonæum has no contractility

and yet it shrinks from its size, as it covers the uterus at term, down to the comparatively small area of the outer wall of the empty organ, the peritonæum over the upper segment usually being without a wrinkle.

The bag of membranes commences to assist in dilatation as soon as the os is slightly opened by the contraction of the upper and the stretching of the lower uterine segment. It forms a fluid and uniform wedge, which becomes progressively more effective as dilatation increases. As a dilator this smooth bag is more effective and much safer than any solid or irregular wedge, such as the head or breech of the fœtus.

STAGES OF LABOR

The three stages in labor are: (1) From commencement of labor till complete dilatation of the cervical canal. (2) From complete dilatation of the cervical canal to the expulsion of the child. (3) Expulsion of the placenta.

The division of labor into three stages is convenient and almost universally recognized by obstetricians. The first stage is that of dilatation of the cervix, during which little or no propulsion of the ovum is taking place. While this is the usual definition, it is not correct. It is really the stage of softening and dilatation of the cervix, vagina, pelvic floor, and perinæum. Normally, rupture of the membranes takes place at or about the end of this stage. Exceptions to this, however, are not infrequent. There is no well-defined boundary between the first stage and the second during which the fœtus is expelled. The third stage is more definite. During it we have separation and expulsion of the placenta and membranes.

The average duration of labor is eighteen hours for primiparæ and twelve hours for multiparæ.

The Changes in the Cervix.—During the first stage we have the "taking up of the cervix," by which process the cervical canal becomes continuous with the lower uterine segment. At the same time the os uteri becomes fully dilated, thus making the vaginal canal continuous with the utero-cervical cavity.

The Taking-up Process in Primiparæ and Multiparæ.—In primiparæ the cervix is fairly long at the commencement of the first stage, the external and internal os being almost, if not entirely, in

their normal condition. First the internal os is dilated, then the extravaginal portion of the cervical canal, then the intravaginal portion, and last the external os.

In multiparæ the external os is usually dilated and the cervix is somewhat patulous at the commencement of the first stage. During a vaginal examination the finger frequently passes easily into the cervical canal until it reaches the internal os. As uterine contractions continue this internal os dilates. As the internal os is being stretched the whole canal becomes dilated at the same time. This is quite different from the condition in the primiparæ when the dilatation travels from above downward. The result is that as soon as the "taking up" of the cervix has ceased the uterine orifice is encircled by blunt, comparatively thick edges instead of extremely thinned edges, as in a primipara.

METHODS OF EXAMINATION

Abdominal Palpation.—We can ascertain by palpation of the abdomen (Jellett) seven important facts:

1. The presence or absence of pregnancy, at any rate from the seventh month onward, by feeling a tumor shaped like the uterus, and by feeling fœtal parts within it.

2. The period of pregnancy, by mapping out the height of the uterus.

3. The presentation and position of the fœtus.

4. The presence of pelvic contraction, which is by far the commonest cause of non-fixation of the head. If we find that the head ballottes freely above the brim at a time when it should be fixed, pelvic contraction is the first thing to be thought of.

5. If the patient is in labor the important points are, the presence of pains or of painless contractions; and in the multiparæ, the fixity or non-fixity of the presenting part.

6. The course and progress of labor, by noting the descent of the presenting part. In the early stages the height of the chin above the symphysis can be measured in finger-breadths. As labor advances the chin approaches the level of the symphysis and then sinks below it. The rate of advance can now be determined by the fourth grip (as described hereafter).

7. The indications of threatened rupture of the uterus, by the rising of Bandl's ring upward in the abdomen.

DESCRIPTION OF ABDOMINAL PALPATION

Grips in Palpation.—Four distinct grips or methods of applying the hand are used. One should avoid undue pressure, as it causes pain and contraction of the abdominal muscles and renders further palpation impossible. One should avoid, also, lifting the finger-tips off the abdomen—"playing the piano on the abdomen"—as this also causes contraction of the recti. The fingers and hands should be moved gently from place to place without lifting them off.

1. *Fundal Grip.* The patient is placed flat on her back with her pelvis and her legs extended. The physician then sits down

FIG. 55.—ABDOMINAL PALPATION. EXAMINATION OF THE UPPER POLE OF THE FŒTUS. FUNDAL GRIP.

at her right side, about the level of the pelvis and facing her head. He next lays both hands, gently, flat upon the fundus of the uterus and feels what is lying there. He notices the shape and mobility of the part of the fœtus lying beneath the hands.

2. *Umbilical Grip.* Having palpated the fundus, the hands are moved gently downward until the level of the umbilicus is reached. By moving the hands about the nature of the fœtal parts at that level can be ascertained. To determine upon which side of the uterus the back of the child lies, the hands are laid flat on either side of the uterus and moved synchronously first to one side, then to the other, making the uterine contents move with them. By this means one notices that there is a greater resistance

offered to one hand than to the other. This greater resistance is usually on the side at which the back is. McIlwraith says that in examining the middle zone of the uterus one can more readily

Fig. 56.—Examination of the Middle Zone. Umbilical Grip.

detect the back of the child by the following manipulation: One hand is placed on the fundus and feels that part of the uterus;

Fig. 57.

The same as in Fig. 56, except that the position of the fœtus is determined by a greater resistance being felt by the lower hand over the back than over the front of the fœtus.

the other hand presses first on one side of the middle zone, and then on the other. Pressure on the back of the fœtus makes

the part under the fundal hand move. Pressure on the other side of the middle zone does not.

Fig. 58.—McIlwraith's Maneuver.

The hand at the fundus presses the fœtus downward against the symphysis. Then pressure on the back of the fœtus with the other hand makes the upper pole of the fœtus move under the hand at the fundus; pressure over the front of the fœtus does not do so.

3. *Pelvic or Pawlic's Grip.* This is made with the right hand only. The fingers are sunk into the false pelvis over the center of

Fig. 59.—Examination of the Lower Pole of the Fœtus. Pawlic's Grip.

Poupart's ligament on the left side and the thumb into the corresponding point on the right, and then they are approximated. By

this means one discovers what is lying in the pelvic brim and whether it is movable or fixed.

Fig. 60.—Deep Pelvic Grip.

4. *Fourth Grip.* This is only necessary when the presenting part has sunk deeply into the brim. Instead of facing the patient's

Fig. 61.—Head Presentation, Heart + below Umbilicus.

head one should turn so as to face her feet. Both hands are used. The tips of the fingers of the right hand are sunk into the true pelvis on one side, and the tips of the fingers of the left hand similarly

on the other side. By this means the extent that the presenting part has descended can be estimated.

Examination per Vaginam.—By it can be determined the nature of the presenting part, the fixity of the presenting part, the condition of the membranes, the size of the os uteri, and the presence of a prolapsed limb or cord.

Auscultation of Fœtal Heart.—The heart sounds vary with the position of the fœtus. If the head is in the lower segment the heart sounds will be heard below the horizontal umbilical line. If the head is in the upper segment the heart sounds will be heard above this line. Generally the sounds are best heard at that side

Fig. 62.—Breech Presentation, Heart + above Umbilicus.

of the abdomen toward which the back of the fœtus lies, excepting in a case of face presentation, in which they are generally heard on the side of the abdomen where the limbs are.

MECHANISM OF LABOR

Vertex Presentations.—The vertex is the space between the anterior fontanelle and the posterior, and is the lowest portion of the head in vertex presentation. Vertex presentations occur in about 96 per cent. of all labors.

The following classification of vertex presentations is the one most commonly used and most easily understood. It is presumed that the occiput is the most important part to be considered, and four positions of the occiput are recognized:

1. Left occipito-anterior—L. O. A. The occiput points to the left foramen ovale. The forehead points to the right sacro-iliac synchondrosis. The long diameter of the head is in the right oblique diameter.

2. Right occipito-anterior—R. O. A. The occiput points to the right foramen ovale. The forehead points to the left iliac synchondrosis. The long diameter of the head is in the left oblique diameter.

3. Right occipito-posterior—R. O. P. The occiput points to the right sacro-iliac synchondrosis. The forehead points to the left foramen ovale. The long diameter of the head is in the right oblique diameter.

4. Left occipito-posterior—L. O. P. The occiput points to the left sacro-iliac synchondrosis. The forehead points to the right foramen ovale. The long diameter of the head is in the left oblique diameter. Some prefer to add the word iliac in accordance with French nomenclature. For example, the first position would be called the left occipito-iliac-anterior position or L. O. I. A. We are told that there is no doubt as to what this means, whereas the term left occipito-anterior might be applied to either breech or vertex presentation.

In the great majority of cases the long diameter of the head is in the right oblique diameter of the pelvis—i. e., the most frequent positions of the occiput are the left front and the right rear, or the first and third vertex presentations, respectively. The first position, L. O. A., is by far the most frequent, and probably occurs in about 70 per cent. of vertex presentations.

FIRST POSITION OR LEFT OCCIPITO-ANTERIOR

On vaginal examination a hard round tumor, with sutures and fontanelles, can be felt. The posterior fontanelle is near the front of the pelvis; the anterior fontanelle is nearer the back of the pelvis. The posterior fontanelle is small and triangular and is the point where three sutures meet. Feeling these three different sutures may be our chief guide to diagnosis. Fothergill gives the following practical point: Pressing on the posterior fontanelle, the angle of bone which dips below the other two is the tip of the occipital bone whose position is thus known. This is, I believe, generally correct and has frequently helped me to make a rapid diagnosis of occipito-anterior position. The anterior fontanelle is

high up toward the mother's back and can be felt in a certain proportion of cases. It may be recognized by its lozenge-like shape, its large size as compared with the posterior fontanelle, and the fact that four sutures meet there. The sagittal suture runs between these two fontanelles. If the finger-tip, after it touches the suture, is directed toward the mother's pubes, it should reach the small fontanelle. If it is directed backward and if it is pushed far enough, it will reach the anterior fontanelle. If it can reach the anterior fontanelle very easily, there is something abnormal.

The most favorable time for examination is immediately after rupture of the membranes. As labor goes on the presenting part becomes œdematous and the bones lap over each other more or less, owing to the molding. It may thus become difficult or impossible to recognize either the sutures or fontanelles. Sometimes, when one has been unable, after both external and internal examination, to decide as to presentation, the accoucheur may obtain valuable information by placing his finger or fingers on the ear of the child. This can generally be reached *per vaginam;* and its lobule, pointing to the occiput, will give positive evidence as to whether the occiput points to the front or the rear.

Flexion with Descent.—It is true that descent goes on with all the movements that are concerned in the mechanism of labor, but it is well to give this process some prominence in connection with the early movement of flexion. While the head descends, it at the same time becomes flexed.

The result is to substitute the sub-occipito-bregmatic diameter for the occipito-frontal—that is, the shorter for the longer diameter. This allows the head to slip easily into the pelvis when it could not do so before. This is illustrated by Fothergill, as follows: "Just as a man can get a hat on the back of his head which is too small to fit on the top of it, so a fœtal head can pass through a pelvis when the occiput is leading which it could not traverse with the vertex leading." During this flexion or dipping of the occiput, the posterior fontanelle becomes more perceptible to the touch, the anterior fontanelle passes backward and upward out of reach, and the presentation is changed from vertex to occiput.

Internal Rotation.—After flexion the head advances, with the presenting part, the occiput, lying lowest until it reaches the pelvic floor. The posterior part of this floor forces the occiput to turn

in the direction of the least resistance—that is, to the front or under the pubic arch. Berry Hart thinks that the great factor in producing rotation is the recoil of one lateral half of the sacral segment on the part first touching it.

Extension. After internal rotation has been completed and the occiput is turned to the front the head is forced in a downward direction. Up to this time the head has passed downward and backward; it now takes what may be called a sharp curve forward; the difference in direction, which takes place almost suddenly, involves nearly a right angle. Before delivery is accomplished there must be a certain amount of extension of the head, although the chin does not leave the sternum until the greater part of the head has emerged from the vulvar outlet. It is exceedingly important to remember that this movement of extension is not nearly so great as was formerly supposed. I think, however, that the correct description of the mechanism of delivery varies little from that which was given about eighty years ago.

Opinions of the Edinburgh School. The Edinburgh school appears to think differently, and as it has taught us so much with reference to the physiology and pathology of pregnancy and labor, its views are worthy of careful consideration. Berry Hart speaks highly of Naegele's epitome, which was translated by Rigby in 1822, and, while he believes the account of the relations between the fontanelles and bony pelvic canal are correctly described, he thinks that Naegele's description is inaccurate in other respects. He speaks especially of flexion and extension, which, as descriptive of certain movements, are in his opinion most misleading terms, while he does not profess to know how to abandon them. He thinks one can only define them anew. He considers that when a new definition is a contradiction of the accepted use of the term the student's mystification may be only imagined. He refers to certain measurements between the pubes and fundus as ascertained by Shroeder and Stratz (which I shall consider presently), and to the study of frozen sections, as furnishing a new theory of the mechanism of labor which is now too little taught, but will become a basis for accurate teaching in the future. He states that the present teaching, as to its nature and nomenclature, is in the melting-pot, and how it would emerge would be difficult to predict; the hard-worked student will certainly suffer most in this process. It seems somewhat strange

and very discouraging that a school so brilliant in teaching capacity as that of Edinburgh, should be unable, after studying the question carefully for fifteen years or longer, to do anything more than mystify its students.

Opinions of Schroeder and Stratz. The following are some of the clinical facts ascertained by Schroeder and Stratz. These clinicians found, by actual measurement during labor, that the fundus of the uterus is quite as high after the head has descended to the pelvic floor as at any previous time. Men in London and in Edinburgh have reached similar results. It seems that after the liquor amnii escapes uterine contractions act on the fœtus in a different manner. The circular fibers contract more strongly than the longitudinal, causing the uterus to become narrower and longer, the fœtus at the same time becoming straightened and lengthened.

We are told by the Edinburgh school that there is no flexion as the head becomes engaged in the brim, although it is true that during this time the posterior fontanelle becomes more palpable. They say this is due, however, to the fact that the occiput dips below the sinciput. They also say the lever theory of flexion is incorrect, for two reasons: first, it gives a cause for a movement which does not occur; second, it is doubtful if any pressure is transmitted to the head through the spine.

Referring to the measurements before spoken of, they say that the fundus does not sink during the second stage, the fœtus is elongated and the curved spine of intra-uterine life is straightened. Fothergill tells us that to understand this subject it is necessary to remember that the term flexion was applied to this movement, when the movement was supposed to be a flexion of the child's head relative to the child's body. Now that the movement is understood to be only a movement of the head relatively to the pelvis of the mother, the term flexion is retained, with a meaning which does not belong to it. This use of an old name with a new meaning is misleading, and it remains to be seen how long the term will be retained in the nomenclature of the mechanism of labor. It is stated that sectional anatomy shows that the chin is touching the sternum before the so-called flexion takes place, and, therefore, the flexion of the head can not be possible.

I shall say nothing about the different theories, whether they be called lever, wedge, or inclined plane; but I think that flexion and extension do take place pretty much in the way which has been

described during so many years. I do not see that proof has been brought forward to show anything to the contrary.

Flexion and Extension.—First, as to flexion, I understand that it is not considered possible that flexion of the head can take place while the chin is touching the sternum. Let a person who is sitting keep his back in contact with the back of his chair and bend his head until the chin touches the sternum. Let him then keep the lower portion of his back against the back of the chair, and at the same time flex the upper part of the spine. He will be able to bend the head forward 40 to 60 degrees without much difficulty. On account of the great flexibility of the spine of the fœtus the head in the undelivered child may be bent still more. I am at a loss to know, in connection with the movement which takes place and which brings down the occiput, the difference between "dipping" and flexion.

It seems still more evident that there must be extension of the head before its delivery and also before it reaches the vulva. It is stated correctly that the posterior fontanelle is the presenting part after internal rotation has occurred, and that it is still the center of that part of the head which becomes visible when it has descended as far as the vulvar aperture. In the first instance the posterior fontanelle is pointing backward toward the coccyx, the body of the child is held within the tightly constricting uterine walls, the fundus and body of the uterus can not be tilted backward to any material extent, if at all. Under such circumstances, it does not seem possible for this presenting part to change its direction to the extent of nearly a right angle without extension of the head. It may be that straightening of a spine which was before curved or flexed causes the occiput to be forced forward. If such movement of the head is not extension, what is it? Fothergill says it is only slight undoing of flexion. What is the difference between extension and undoing of flexion?

It is true that the fundus uteri, just before the escape of the head, is higher than it was at the commencement of labor. Such lengthening of the uterus is partly due to the action of the circular muscular fibers, but also to the straightening of the fœtal spine which probably causes the extension of the head.

I should not spend so much time over this subject were it not for its vast importance from a clinical standpoint. Without giving any further reasons now, I shall consider that the head can be

flexed at the brim either by Nature's effort or by our own. In other words, I shall consider that it is always possible for Nature, in her own way, or for us, by pushing on the occiput, to change a vertex into an occiput presentation.

External Rotation.—As soon as the head is born and free to move as it pleases it recovers its usual relation to the shoulders. It does this as soon as the head clears the vulva, generally rather quickly. The right shoulder now rotates to the front, and as the head turns with it the face is brought exactly to the mother's right. External rotation occurs in all mechanisms in which the head is born first. At the end of the rotation the back of the fœtus always looks to the same side of the mother as it did when the head entered the pelvis at the beginning of labor.

Molding the Head.—In all labors the head is more or less changed in shape while it is being driven through the pelvis. This is an important fact in connection with the mechanism of labor because it assists in the adaptation of the head to the pelvis. In vertex presentations the occipito-frontal, sub-occipito-bregmatic, bi-temporal, and bi-parietal diameters are diminished, while the longest diameter of the head—that is, the diameter between the chin and a point in the sagittal suture in front of the occiput—is increased. The caput succedaneum—that is, the œdematous lump formed at the presenting part—forms at first near the coronal suture over the right or left parietal bone as the fœtal head lies in the first or second position. As the head descends this swelling or caput moves backward along the sagittal suture until it lies close to or slightly over the posterior fontanelle. In other than cephalic presentations a similar swelling develops on the presenting part.

THE OTHER VERTEX POSITIONS

The mechanism of delivery in the three other vertex positions differs slightly from that of the left occipito-anterior position.

In the second position, or R. O. A., the left parietal bone is the presenting part; the sagittal suture is in the left oblique diameter; the occiput is forced to the front after it reaches the pelvic floor—i. e., the occiput turns from right to left; after the occiput comes to the front the head is expelled; after the expulsion of the head the face turns toward the mother's left thigh.

In the third position, or R. O. P., the left parietal bone is the

presenting part; the sagittal suture is in the right oblique diameter; the occiput generally rotates from right to left, and thus comes into the second position, or O. R. A., during its progress; the occiput continues to rotate until it comes to the front; after the occiput comes to the front the head is expelled; after the expulsion of the head the face turns toward the mother's left thigh; exceptionally the occiput turns to the rear, causing the difficult occipito-posterior position.

In the fourth position, or L. O. P., the right parietal bone is the presenting part; the sagittal suture is in the left oblique diameter; the occiput generally rotates from left to right and thus comes into the first position, or L. O. A., during its progress; the occiput continues to rotate until it comes to the front; after the occiput comes to the front the head is expelled; after the expulsion of the head the face turns toward the mother's right thigh; exceptionally the occiput turns to the rear, causing the difficult occipito-posterior position.

The following table assists one to recollect the normal diameters of the pelvis:

	Antero-posterior.	Oblique.	Transverse.
Brim	4 in.	4½ in.	5 in.
Cavity	4½ in.	5 in.	4½ in.
Outlet	5 in.	4½ in.	4 in.

The figures are approximately correct and easily remembered: 4, 4½ and 5. The most important diameter, as will be found when considering contracted pelves, is the antero-posterior diameter at the brim—the true conjugate.

CHAPTER VI

MANAGEMENT OF NORMAL LABOR

In some countries it is considered possible for any ordinary woman or man to learn how to conduct a case of normal labor in a few weeks or a few months. The prevailing opinion in America is that it takes an educated woman or man not less than four years to learn how to properly conduct a normal case of labor. We think that no one can intelligently understand all about normal labor until he has a good knowledge of anatomy, physiology, and pathology, and, in addition, has gained a knowledge which will enable him to detect the first sign or symptom of abnormality in any form.

GENERAL DIRECTIONS

The accoucheur will generally have seen the patient before labor. It is certainly very desirable that he should have done so for many reasons.

It is quite an ordeal for a young practitioner to visit a patient in labor whom he has never seen before, and conduct himself in such a manner as to win the confidence and respect of his patient and her friends. A great deal might be said about that rather useful commodity which is ordinarily called tact. If Nature has not given the tact it is not a very simple matter to acquire it. Above all things the most important consideration is to show kindly feeling toward the patient under any and all circumstances. She is apt, in her semi-delirium, to say some rather uncomplimentary things. The absolute rule in this connection should be never to give way to anger; always to be patient and kind. This is the time when we should throw aside all hospitalism and show the most perfect consideration for the suffering of our patient. Kindly actions will certainly bring their reward. The gratitude of obstetrical patients forms the best sort of capital for medical practitioners.

Students and physicians should ever cultivate their powers of observation. When one first sees his patient it is not advisable to ask abruptly about her symptoms. It is better to converse for a time on some ordinary topic. While thus talking, the physician should watch the patient carefully (without, if possible, appearing to do so). He should see and hear as much as possible and thus get a fair idea as to her general condition and also as to the particular symptoms present at the time. One can thus generally obtain an almost exact knowledge as to the frequency and severity of her pains. But comparatively insignificant circumstances, such as the entrance of the physician, often cause emotional disturbances, which have their effects on the pains. Questions asked in a brusque, abrupt manner may cause the pains to be suspended for some time.

It is not easy to explain the difference between the *false* pains which occur so frequently during the latter part of pregnancy (especially during the last two weeks) and the regular or *true* pains of labor. They are, in fact, in many respects similar in character. The *true* pains, however, are more rhythmical and grow in strength and frequency. The early pains are frequently described as *grinding* or *nagging*. They are often very severe and cause suffering which may be more intense than that produced by the later and stronger expulsive pains, even though the latter are more powerful and prolonged than the early pains. The patient instinctively aids them by using the expiratory muscles as in defecation. These bearing-down efforts are partially under the control of the will, as before mentioned in connection with the physiology of labor. A method popular with the laity is to have the patient push with her feet against some fixed object and pull on a sheet tied to the foot of the bed. She takes a deep breath, closes the glottis and puts all the expiratory muscles into action, thus helping the ordinary uterine contractions. The pains are probably caused by the stretching of soft parts, especially the cervix, and by compression of nerve filaments through contraction of the uterine muscles.

Questions.—One naturally soon asks his patient something about her pains. Has she pains? What is their character? Where are they and where were they first felt (in the back or abdomen)? How long do they last? How frequent? Is there any discharge (show)? Without appearing to have any doubt on the subject,

one should try to satisfy himself that she is pregnant and try to ascertain whether she is in labor.

If the patient is sitting up and having only slight pains at long intervals one may ask her general questions as to her pregnancy. If a multipara, one should find out as much as possible about former pregnancies. Has she now reached full term? She may think that she has or has not and will probably give her reasons for such opinions. Inquiries are made on many points, and especially as to last menstrual period, and a calculation is made as to the probable date of labor.

Examination.—This is more or less distasteful to the patient. Fortunately it is considered now that the external examination is the more important and the first which should be conducted. It is better, as a rule, not to mention the word examination. One should not halt or hesitate in an awkward sort of a way, but simply ask her as a matter of course to lie down (unless she is already in the recumbent position). If necessary to say anything tell her that you would like to find how the child is lying in the abdomen.

Abdominal Palpation.—The Dublin method of examination has been described and indorsed. Let us now consider the subject from the clinical side. While palpating we use our eyes in accordance with rules already given as to inspection. The enlargement of the abdomen is not generally symmetrical; there is usually more prominence on the right side of the median line on account of the torsion of the uterus. The umbilicus is generally protruded. We notice the pigmentation and striæ, some at least of which are recent, while others may be old.

In former times the chief method of examination was *per vaginam*. Many practitioners still employ this as their chief method. Most of us now believe that the best method of examination is the external by abdominal palpation. In many cases, with little practise, one is able in a very short time to make a correct diagnosis of position and presentation.

Let us go over a few points to demonstrate this. We shall suppose that in placing our hand, or hands, over the top of the uterus we find the breech at the fundus. This is generally easily detected. We shall also suppose that on placing the hands on the sides of the abdomen we find the back of the child toward the mother's left side, but slightly toward the front. We may have ascertained this much in less than a minute. Does it tell us any-

thing? Yes, it practically tells us everything. The child is lying in the first vertex position.

In another case we find the breech at the fundus and the back of the child toward the right side of the mother; at the same time we feel *small parts* (legs and arms) moving on the left side, rather toward the front. What is the position? The back of the child is toward the mother's right side and inclined to the rear; the occiput must be in the same position—that is, the occiput is toward the right posterior. We probably have third vertex position.

In another case the woman is large and has thick abdominal walls. On placing the hands over the fundus we are not quite sure whether we feel breech or head. On examining the sides of the uterus we think the back of the child is toward the left side but are not certain. Suddenly, however, we feel small parts on the right side of abdomen. We know now the back of the child is on the mother's left, but still we do not know where head and breech are. We examine *per vaginam*, but are unable to reach the presenting part. Pains continue in the mean time. After an interval of an hour we make another vaginal examination. We reach something hard and globular, think it is the head. After moving the finger a little we feel a suture, but are not sure about fontanelle; there is considerable œdema. However, we are fairly certain that we have a first position—that is, left occiput anterior. It is certain that the occiput is toward the left side, because the back is in that position. We must, therefore, have a first or fourth vertex presentation. It is likely to be first, because the fourth is very rare. We feel almost certain that the back of the child is slightly toward the front. However, we shall suppose there is a little doubt. We examine again in another half-hour. We again reach the globular body and find a suture. Running the finger along the suture toward the front, we feel a fontanelle; it is small and formed by the junction of three sutures; that indicates that it is the posterior fontanelle. Perhaps we have found that one of the bones dips as we press on the fontanelle. The bone that dips is the occiput, at least in the great majority of cases. We have now verified our diagnosis, both by external and internal examination. The back of the child is toward the mother's left. The head is presenting with posterior fontanelle toward the front. There can now be no doubt. The child is lying in the first vertex position.

Auscultation.—The fœtal heart sounds are generally double; the pulse-rate is between 120 and 150. The sound is heard most commonly between the navel and the anterior-superior iliac spine on the left side, because the back of the child is located there in a great majority of head presentations. The area over which the sound may be heard has a diameter of from 5 to 10 cm. (2 to 4 in.).

Vaginal Examination.—When a vaginal examination is considered necessary, one should simply ask for some hot water and make the hands aseptic or antiseptic, and make the internal examination as a matter of course. As a rule, it is better to make such an examination after the bladder and rectum are thoroughly emptied. If a competent nurse is present she is asked to prepare the patient. The accoucheur then leaves the room. The nurse should then thoroughly cleanse the vulva and adjacent parts. The physician is probably washing his hands in the next room. When called into the lying-in room he again cleanses the hands in a lysol solution or something of that sort. According to our modern ideas as to cleanliness the correct method is to pass in the finger by sight. In doing this the left hand draws the labia wide apart, so that the first contact of the examining finger will be with the hymen or the vagina inside the hymen.

This involves an exposure so marked that the sensitive woman naturally shrinks from it, especially at this early stage in labor. My custom in private practise is, in a large proportion of cases, to examine the patient lying on her back with her side close to the edge of the bed. She raises the knee by flexing the thigh. I am thus able to put one hand under the thigh and the other over the pubes (right under and left over, we shall say); while doing this the woman is covered with a sheet. I then endeavor with the thumb and finger of the left hand to separate the labia and introduce the finger or fingers of the right hand without any risk of picking up septic matter during the process.

It is better to get into the habit of using either the right or left hand in examining, according to the position of the patient. It happens, however, in a large majority of cases, that the patient and her nurse make their preparations with a view to using the right side of the bed.

Our first aim should be to reach the os and note its form, consistence, and degree of dilatation. Sometimes the external hand may depress the fundus in such a way as to bring the head within

more easy reach. If partial dilatation has taken place the presenting part is examined. The examination is made between the pains, so as to avoid the risk of too early rupture of the membranes. Feeling a parietal bone, then a suture, and then one or both fontanelles will probably give sufficient information as to the presentation. Then the finger is passed around the pelvis to discover any abnormality of shape. An effort is made to find the promontory of the sacrum with the tip of the middle finger. If this can be reached easily one may be practically certain that there is some abnormal condition—that is, a short conjugate diameter with probably a flat pelvis. One should notice whether the vagina is normal, whether its walls are relaxed, whether there is a proper secretion of mucus, or a dry and hot condition; also the condition of the perinæum as to rigidity.

If the perinæum is rigid, the vagina constricted, the os closed, with no secretion of mucus (*show*), the patient is not in labor. If the perinæum is soft and dilatable, the vagina soft and dilatable, the cervix fully dilated, perhaps to such an extent that one can not detect it at all, the patient has completed the first stage of labor—that is to say, the parts are prepared for the passage of the child.

Preparation of the Patient.—The patient, when near term, should wash carefully with soap and water the vulvar region at the time of her daily bath. When labor is expected the nurse should clip the hair about the vulva as closely as possible with a pair of scissors. This assists in the prevention of sepsis and the discomfort which is caused by the clotting of lochia upon the hair. Before the first examination is made in labor the vulva and neighboring parts should be thoroughly scrubbed with soap and water for not less than five minutes. The majority of obstetricians recommend the use of a nail-brush. I do not insist on this always, but I do insist that a nail-brush when used should always be new. An antiseptic pad soaked in lysol, or other antiseptic solution, should then be placed over the vulva. A pad of this sort should be changed somewhat frequently, and the vulva should be thus protected as far as possible until the labor is completed.

Some obstetricians insist that the vagina should then be douched with an antiseptic solution. This is quite unnecessary, unless there is some special indication for it, such as the presence of gonorrhœa or some condition which causes an offensive discharge. In administering a douche before labor one should never

use a bichloride solution, because it corrugates the tissues, hinders to some extent the descent of the presenting part, and renders the tissues more liable to be lacerated; and to formalin these objections apply even more strongly. I think the best solution for antepartal douching is a 1 or 2 per cent. of lysol.

Preparations during Labor by Nurse and Doctor.—The nurse should make arrangements to have water boiling continuously during labor. For such purpose the water may be heated in an ordinary clothes-boiler or preserving-kettle or a teakettle. The advantage in using a boiler or large preserving-kettle is that one may introduce any instruments, such as forceps, etc., for sterilizing purposes. The nurse should also empty some of the water, after it has been boiling for a certain time, say fifteen minutes, into some receptacle, such as an ordinary pitcher, and allow it to cool, at the same time covering the mouth of the pitcher with a sterilized towel. One or two such pitchers, filled with sterilized water, should be placed in the lying-in room to be used for cooling certain solutions, as, for instance, normal saline solutions for subcutaneous injection.

The nurse should also have a sufficient supply of receptacles for her solutions. Ordinary wash-basins, soup-plates, or platters, will suffice. The following will be sufficient for any ordinary case:

Wash-basin for general purposes and especially preliminary hand washing.
Wash-basin for lysol solution, 2 per cent.
Wash-basin for bichloride solution, 1–1000.
Soup-plate for catheter, artery or tongue forceps, and rubber tubing with bulb attached, in lysol solution. 2 per cent.
Soup-plate for twenty small cotton swabs, in lysol solution, 2 per cent.
Soup-plates for cotton, silk, or bobbin, to tie the cord, and cord scissors, in lysol solution, 2 per cent.
Large soup-plate, or small platter, for receiving the placenta. This should be covered by a towel taken from a lysol solution, 2 per cent.
Teacup for boric-acid solution for babe's eyes.

Most of these may be placed on a table at one side of the room. The lysol solution in the wash-basin should be placed close at

hand for the use of the operator, especially during the birth of the child and the expulsion of the placenta.

The doctor should, in good time, put his instruments, including the forceps, in a towel and have them sterilized with boiling water. As before intimated, this may be easily done by placing them in a closed boiler or preserving-kettle containing the boiling water.

Fig. 63.—Room Prepared for Labor.

After they are sterilized the different smaller instruments should be placed in the plates as indicated. The forceps should be wrapped in a sterilized towel.

THE ONSET OF LABOR

Diagnosis.—It is difficult to lay down rules as to the diagnosis of the onset of labor, as it is impossible with our present knowledge to name any definite set of symptoms which will indicate with certainty the exact time of the commencement of labor.

While making an examination one may be able to determine that the presenting part is low down. Although under such circumstances the os is but slightly or not at all dilated, one might consider that labor had either commenced or was about to do so. This, however, would not always be correct, because under ordi-

nary circumstances the presenting part is almost invariably low down in primiparæ one to two or three weeks before the onset of labor, whereas in multiparæ the presenting part may remain higher up until the labor is well advanced. Excessive cervical secretion (the so-called "show"), together with pains, furnishes the most certain sign of the onset of labor. Unfortunately, however, even the combination of pains and show does not furnish a positive indication. Sometimes such excessive cervical secretion is not immediately followed by labor, and occasionally labor sets in without it.

Regular, rhythmical contractions gradually increasing in frequency and severity, progressive dilatation of the os, together with the copious blood-stained discharge, indicate with certainty that the patient is in labor. We have been told that even these three concurrent signs are not necessarily followed by progressive labor. For instance, "in a patient suffering from contracted pelvis, where labor was induced by the introduction of De Ribes's bag, containing 16 ounces of water, through the cervix without rupture of the membranes, regular pains ensued until full dilatation of the os. The bag was then expelled, the pains gradually ceased and twelve hours afterward the os had contracted down to the size of a two-shilling piece. Twenty-four hours afterward the os just admitted two fingers with difficulty. The bag was again introduced and the membranes artificially ruptured, when the bag was expelled. Labor terminated naturally" (Mathew, Queen Charlotte Hospital).

It is quite true that when dilatation of the os has been produced by artificial stretching it may be followed by more or less contraction after the stretching process is stopped and thus prevent the progress of labor for a more or less indefinite time. This does not contravene the clinical fact that regular pains, show, and natural dilatation of the os indicate positively the condition of labor.

We are often asked by the patient or nurse to name the sign which will indicate the necessity or advisability of summoning the doctor. It is easy and correct to say that as soon as the patient has regular pains similar to those which have been already described as true pains, together with a show, the patient should be considered in labor. The physician should try to explain the difference between the so-called true pains, which generally radiate from the back, and the false pains, which are more apt to appear in the front, and are generally due to colic. It is safer, however, to have

the patient or nurse consider that the doctor should be summoned when the patient has anything like severe pains, whether commencing in the back or front and whether accompanied or not by excessive cervical secretion and dilatation of the os. The following rules are useful for the nurse and young accoucheur:

I. Rules for the Nurse. Send for the Doctor—

a. When there are pains with excessive cervical secretion—"show" (almost certain).

b. When there is "show" even with doubt as to character of the pains.

c. When there are fairly severe and regular pains, especially when they radiate from the back.

II. Rules for the Doctor.

a. When there are rhythmical contractions (pains) gradually increasing in frequency, show, and dilatation of the os, with or without protrusion of the bag of membranes, the patient is in labor.

b. When the contractions are not strong nor frequent and the os is only dilated to the size of a twenty-five cent piece the patient is in labor but not far advanced. One may probably leave her for an hour or two, especially if a primipara.

c. When the contractions are strong or fairly strong and frequent and the os dilated to the size of a fifty-cent piece, the patient is probably well advanced in labor. It is not safe to leave her.

The Obstetrical Satchel.—No one has been able as yet to furnish an obstetrical satchel which is satisfactory in all respects. The ordinary leather bag can not be kept aseptic and for this reason some have used metallic cases. These, however, are heavy and clumsy. The so-called aseptic midwifery bag with removable linings ceases to be aseptic, as a rule, when it is handled. Most surgeons and obstetricians continue to carry their instruments in leather satchels or bags. For obstetrical purposes I prefer the leather cabin bag, 16 or 18 inches long. The articles placed in the bag should be protected by proper coverings; the best material for such being metal, glass, or washable linen or cotton.

The following articles are recommended for the satchel:

Axis-traction forceps.
Pelvimeter.
Hypodermic syringe with morphine and strychnine tablets in a case.
Artery forceps which may be used as a needle-holder.
Needles in metal case.
Scissors.
Double tenaculum.
Uterine dressing forceps.
Posterior, or Sims's speculum.
Hollow needle for hypodermoclysis.
Nail-brush.
A soft rubber tube with bulb attached.
Catgut, silkworm gut, and silk in hermetically sealed bottles or tubes.
Ergot.
Lysol or carbolic acid.
Tablets of corrosive sublimate.
Antiseptic powder.
Tablets of chloral.
Chloroform.
Mixture of chloroform and ether (equal parts by bulk).
Sealed packet of iodoform gauze (5 per cent.).
Gravity, or Davidson's syringe.
Glass or metal douche tube.
Soft rubber or glass catheter.
Buckmaster's sling or Robb's leg-holder.
White linen coat or operating gown.
Rubber gloves.

The Accoucheur's Dress.—Very few modern surgeons think of operating either in hospital or private practise without wearing a fresh gown or apron of some sort. Obstetricians do not so commonly prepare themselves in this way; many of them simply take off their coats and roll up their sleeves within sight of the patient, and look sometimes as if preparing for a fight. The sight of a big, muscular doctor thus preparing to treat a poor, delicate, little woman, generally causes fear and trembling. On the other hand, I can not say that I admire a butcher's apron, nor the nightgown such as old Smellie used to wear a hundred and fifty years ago, but prefer a plain white coat with short sleeves, buttoned either in front or behind. Let the physician choose what he likes, however, so long as it is clean, but he should prepare himself in an adjoining room, not in the patient's bed-room. This is especially

necessary if he uses overalls as well as a gown. If he has nothing better let the nurse fasten over his waistcoat, shirt or suspenders, a large towel to take the place of an apron, and also a smaller towel around one or both forearms.

The Lying-in Chamber.—One should choose, if possible, the most suitable room in the house. It should be large, airy, and removed as far as possible from the noise of the house and the streets. There is always a certain amount of danger when the room is close to a water-closet, or when there is in it a sink or basin with waste pipe passing through it. All unnecessary furniture and heavy curtains should be removed.

The Bed.—It is better to have a bed which is narrow and fairly high, but in the majority of cases one will have to take the bed as he finds it. A soft feather-bed, however, is decidedly objectionable. We scarcely see such a thing in our larger cities, but in many country districts a feather bed is highly prized. When it is present on the obstetrical bed it should be removed. Sometimes a poor mattress on weak springs is almost as objectionable as the feather-bed, especially where interference is required, as, for instance, in the management of breech cases and forceps delivery. Under such circumstances the placing of one or two boards immediately under the mattress—that is, over the springs—improves the condition of the bed very materially.

Two pieces of mackintosh or rubber sheeting—one full size of bed, the other half size—are required. The rubber sheeting is more expensive, but if it is thoroughly cleaned after labor it may be used for two or three years on the infant's bed (Cooke). It is a good plan to use a large mackintosh and a small piece of rubber sheeting.

The large mackintosh is used chiefly to protect the mattress. The under blanket, bolster and sheet are used to make the bed comfortable. The smaller mackintosh or piece of rubber sheeting with the draw sheet is used to protect the bed from the copious discharges which take place during the second and third stages of labor and is so arranged that it can be easily removed from the bed after the completion of labor. Some of our obstetricians use the Kelly's pad or something similar to it, but I do not recommend its use in ordinary private practise, because, in the first place, it is too bulky for a satchel such as I have described, and in the second place, it is difficult to keep it aseptic. It is also very liable to become displaced and interfere with labor, more especially if forceps are

being applied, with the patient on her side. There are, however, specially made pads of other material, such as wood wool, cotton-batting, etc., which are very convenient.

Antisepsis and Asepsis.—Every physician should carry out certain definite rules as to antisepsis and asepsis. His constant aim should be to have his patient, her surroundings, and himself perfectly clean. He may do that perhaps with soap and hot water, and may call his methods aseptic. If so, I shall not object, although I may say that both soap and hot water are to some extent antiseptic or germicidal. I prefer, however, the use of stronger antiseptics for certain purposes. If called upon to recommend only one antiseptic for midwifery practice I should certainly choose lysol. A few years ago I should have said carbolic acid. Either of these is, in a sense, unobjectionable if not used in poisonous doses, while corrosive sublimate, as already stated, is sometimes injurious, especially when used immediately before or during labor.

After using carbolic acid for years I tried lysol, but, finding its odor somewhat unpleasant, I went back to carbolic acid. After using this for a time and carefully comparing results, I have again chosen lysol as the best all-round antiseptic for obstetrical purposes. As compared with carbolic acid it is less corrosive, less poisonous, more readily miscible with water, less likely to injure the hands, and above all other comparative considerations, is decidedly soapy in character; at the same time lysol is probably quite as destructive of microbes as carbolic acid. I, however, always carry bichloride tablets and use them especially for cleansing the external parts after labor.

While I advise and use both antiseptic and aseptic methods, I quite agree with Dührssen that "the introduction of asepsis without antisepsis into midwifery is a mistake, since the field of operation in midwifery is a germ-containing one."

For ordinary obstetrical purposes make the antiseptic solutions in the following proportions: Lysol solution, 1 or 2 in 100, or, roughly speaking, one or two teaspoonfuls to the pint, supposing the ordinary teaspoon to contain about 80 minims; bichloride solution, 1 to 1000—that is, one 7½ grain tablet to a pint.

Lubricants.—One should not use, as a lubricant for the finger, any vaseline, oil, etc, that may be in the house. One should also avoid the so-called medicated lubricants, because many of them are absolutely worthless and frequently harmful. The physician,

after anointing the finger or fingers with one of these lubricants, may carry pathogenic germs into the parturient canal and leave them there so protected that they can not be washed away by the liquor amnii. The most common of these antiseptic lubricants is probably carbolized vaseline, which has been proved to be, in certain cases, a good culture medium for the bacteria, the vaseline protecting the germs from the action of the carbolic acid. It has been pointed out by some obstetricians that the application of a lubricant to the finger adds an element of safety when there are sores on the vulva or vaginal wall. That is true to a certain extent, but when such sores are present one should always wear rubber gloves.

FIRST STAGE OF LABOR

Importance of Enemas.—The patient is now in her lying-in room; she has been properly prepared for labor. For weeks or months we have been trying to get her into good condition. We have especially looked after the liver and kidneys and have kept the bowels open. What next? Let the nurse administer an enema. "There is no necessity for that, Doctor," the nurse may say, "because the patient has already had two evacuations this morning, in fact she almost has diarrhœa." Make no difference on that account. In *all cases* one should insist on the administration of an enema. A short time ago I had a somewhat tedious labor. I had looked after my patient carefully during pregnancy and had one of my best nurses. She had looked after everything required for the labor, as I supposed. I found it necessary to apply the forceps, and, on using traction, some soft fæces emerged from the anus. "Didn't you administer an enema, Miss S.?" I asked. "No, Doctor, it was not necessary; her bowels were well moved this morning." The extraction was somewhat slow and a plentiful supply of the softened fæces came constantly during the process. The nurse was kept busy using towels in the necessary cleansing process, and, while doing so, I hope learned the lesson which I supposed she had been taught some years ago in our Training School for Nurses.

The following morning, on going to the Burnside, I asked Miss McKellar when she considered an enema should be administered before labor. She said, in all cases. "But," I asked, "what will you do if the patient already has diarrhœa?" "In any case we

administer the enema. Is that not what you teach, Doctor?" "Yes," I said, "but, notwithstanding what you and I teach, some of your nurses do not understand what they should do under such circumstances."

It happens that the escape of fæcal matter in these so-called diarrhœa cases is frequently the worst sort one meets with. Such an accident is not simply unpleasant, it is also dangerous, because it interferes sadly with asepticism and it is often exceedingly humiliating to a patient. This is one of the *small* points in connection with the conduct of labor which should be considered important. When an enema has been administered early in a prolonged first stage it is well to have a second enema administered after an interval of twelve to fifteen hours. Some women object strongly to the administration of an enema, but if one explains to such how the enema is likely to prevent unpleasant accidents she will, as a rule, readily withdraw her objections.

Directions for the Nurse after Labor.—Definite directions are given to the nurse with reference to the after-treatment of the patient, especially for four days. If not certain as to her methods the directions should be put in writing. Why specify four days? Certainly not because I wish the nurse to become careless at the end of four days. But the rents and tears in the parturient tract are covered with healthy granulations in three or four days. Such a granulating surface is practically non-absorbent.

Cases of Emergency.—At an examination a few years ago I asked a graduating class: What should the obstetrician do when he came into the room while the child was being born? Some in their answers gave full directions as to the preparation of the hands before touching the mother or babe. I need scarcely point out the absurdity of such a course of action. In such a case one must help the patient and child at once. Receive the babe in one hand and place the other over the uterus, then clean the hands thoroughly before touching the vulva or vagina. One may be called upon to conduct a case of labor without any of the ordinary instruments or antiseptics recommended for the satchel; in such a case he should aim at doing aseptic work. This is not difficult to do in any house, especially if soap, hot water, and clean towels can be obtained.

Introduction of Hand into Uterus.—The accoucheur should wash well the hand, wrist, and arm before introducing the hand

into the uterus. I presume that the hands have been washed before this and also that the vulva and adjacent parts have been carefully cleansed. Such directions, of course, are common as to midwifery practise. A great many add, however, that an intra-uterine douche should always be administered after the hand has been introduced into the uterus. I have never given any such recommendation nor adopted any such rule for myself. In the first place, certain dangers are always associated with intra-uterine douching. In the second place, there is no necessity for such procedure after introducing a clean hand into the uterine cavity.

Prognosis.—The physician, after having made his examination in the ways already indicated, will have reached certain conclusions. He will have found the condition favorable or unfavorable, as the case may be, and will have formed some idea as to the progress of labor. He will be asked certain questions of which the following is probably the most common: "Is everything right?" The patient or her friends, in asking such a question, mean, "Is there any danger to the mother or child." If he finds the head presenting in a favorable position and the condition otherwise quite normal he may answer with confidence, that there is no sign of danger to either the mother or child. The answer should always be as favorable as possible. The physician may sometimes be in doubt or find something absolutely unfavorable. It is better to explain his misgivings to the relatives of the patient rather than to the patient herself.

Another question very commonly asked is: "How long will labor last?" or "When will it be over?" The physician should be very careful as to how he answers this, because, as a matter of fact, he does not know, nor will any number of years of experience enable him to give a definite answer to such a question. It is not necessary to say in an abrupt way, "I do not know." It may be well to say that if everything goes on well it is likely that labor will be completed within a few hours or possibly within one hour or less, but the little clause commencing with "if" should never be forgotten.

Diet During Labor.—It is not necessary to give any very definite rules as to diet during labor. In a large proportion of cases the patient wants but little and may generally have what she desires. Simple, light diet, however, is best for her, because the process of labor interferes to some extent with that of diges-

tion. In considering the evil effects of overfeeding during labor it is always well to have in view the administration of chloroform.

Occasional Absence from the Room.—The pressure upon the bladder and rectum generally causes frequent desire to pass water and evacuate the bowels. On this account the physician should make it a point to retire occasionally into another room. In fact, if he has a good nurse it is better for him to be out of the room as much as possible during the early part of the first stage. It sometimes happens in practise among the poorer classes that there is no second room to which one can retire. In such a case there is no necessity for worry, as the patient will be forced to adapt herself to the circumstances in which she is placed.

Position During the First Stage.—The patient should, as a rule, do pretty much as she pleases during the first stage. It is not necessary nor desirable to keep her in bed during the early hours of the first stage. It often happens that the pains are more effectual when she is sitting, standing, or walking. For these reasons the question of position may be left to the patient. If the pains become feeble when she lies down on a lounge or a bed one may encourage her to get up occasionally and walk about. It is not well, however, to make her take too much exercise during a tedious labor.

While it is well to allow a woman to assume any position she pleases early in labor, it is advisable to adopt the rule that a woman shall always go to bed when the pains have become very strong.

Progress.—One can generally have a fair idea of the progress of labor by carefully observing various symptoms. As labor advances the pains should become more frequent, stronger, and longer in duration. It is difficult to have any definite idea without occasional vaginal examinations. These should, however, be infrequent, chiefly because we wish to avoid all possible chances of causing septicæmia. When the os uteri and soft parts below it are becoming dilatable and dilated labor is advancing.

While we attach much importance to dilatation of the os, we should attach similar importance to the dilatation of other parts which must occur before the child can be safely born. We find the following conditions in practise: Early in the first stage, on making a vaginal examination, one can barely insert one or two fingers sufficiently far to reach the os uteri. The perinæum, pelvic floor, vulva, vagina, are all more or less rigid and contracted.

After labor has gone on satisfactorily for a number of hours a great change has taken place. These parts have become first œdematous, then softened, then dilatable, then actually dilated or stretched. One may now introduce within the vagina the whole hand without causing any more pain or discomfort than was previously produced by the introduction of one or two fingers. When all these structures have become softened and dilated, the parts are properly prepared for the expulsion of the child.

When may a Patient be Left?—The doctor is not required during the whole or even a large part of the first stage of labor. He is generally summoned during that stage, makes his examination and probably reaches certain conclusions. If he finds that very little progress has been made, that the first stage is likely to continue for many hours, he may leave the house, pay other visits, and return at a certain time. When is it safe for a doctor to leave his patient, and how long may he stay away? In a large proportion of cases there is no special difficulty in deciding early in labor that he is not likely to be wanted for some hours.

In the following case a doctor of my acquaintance was absurdly cautious, if not extremely ignorant. During his first year in practise he was called to see a patient supposed to be in labor. Three or four of the wise women of the neighborhood surrounded her bed. The patient was pulling hard on a sheet attached to the lower end of the bed and was encouraged in her efforts by her good friends who told her to "hold her breath and bear down." The doctor thought things looked serious, but on making vaginal examination could discover little or nothing. He thought this was due to want of skill, and was correct in so thinking. He deemed it safer, however, to stay a portion of the night. After some three or four hours the pains diminished to such an extent that the patient fell asleep. He then thought he could with safety leave the house and told the friends to summon him when he was required. After ten weeks he was again summoned to the house when he found the patient actually in labor, and then conducted the case in a way that was satisfactory both to the friends and himself.

One may be guided largely by the advice of Swain and Gooch, which was pretty much as follows:

The physician may leave the patient in the first stage of labor under the following circumstances (Swain):

1. In the case of a primipara if the presentation is natural and the os uteri not yet dilated to the size of a fifty-cent piece.

2. In the case of a multipara if pains are few and weak, the presentation natural, and the os uteri not yet dilated to the size of a twenty-five cent piece.

3. In any case if there have been very few pains before the physician's arrival, and none for at least one hour afterward. If the pains have ceased in consequence of the patient's nervousness at his sudden appearance he will, by waiting an hour, have allowed ample time for the effects of this feeling to wear off.

Gooch gave excellent advice pretty much as follows:

The propriety of leaving a patient in labor will depend upon many circumstances, but principally upon whether or not it is a first labor. If a first labor and one can be within call, he may visit other patients, return, ascertain the condition, and perhaps go out again. This he may do until the os uteri is dilated to the size of a fifty-cent piece, a process which will occupy about two-thirds of the time of labor. Afterward no prudent man should leave his patient until labor is completed. But, if it is not a first labor, the progress is very different. The patient has slow pains occurring about every ten or fifteen minutes, just sufficient to remind her that she is in labor. The accoucheur is informed so that he may be easily reached. On being sent for after a notice of this kind, he will find that these trifling pains have been sufficient perhaps to completely dilate the os uteri, "the pains now become stronger and the membranes more distended—presently they are ruptured—gush goes the liquor amnii, and if his arrival has not been pretty expeditious he may be greeted, on entering the room, with the squall of the child under the bedclothes. If I am called to a labor which is not the first and find the pains regular, though slight, however trifling may be the dilatation of the os uteri, I am exceedingly shy of leaving my patient."

Assistance, Bearing-Down, etc.—It unfortunately happens that we are not able to render much assistance during the first stage of labor even though the woman may suffer seriously from the peculiar "grinding" pains. It may be laid down as a rule that one can do very little before the end of the first stage in a normal case. When this stage continues longer than it should, it becomes to some extent abnormal and tedious and may require definite treatment. It sometimes happens that one or two warm baths help to alleviate

the pains. These are, of course, always safe. The nurse and doctor should do all that they can to encourage the patient. While it is not easy to tell definitely how the patient may be assisted, it is less difficult to tell what should not be done. The patient should not be allowed to tire herself out by pulling on a sheet and by the so-called bearing-down. It is well to guard continuously against anything of this sort, because nurses and friends of the patients are so apt to give bad advice in this regard. There may be and is frequently a time for "holding the breath and bearing-down," as hereafter mentioned, but that is not during the first stage.

Preparation of Patient Toward the End of the First Stage.—During the early part of the first stage the patient should be lightly clad with undergarments covered with an ordinary wrapper. When the pains become strong toward the end of this stage and the patient has to lie on her bed, which has been prepared in accordance with directions already given, she should wear her night-dress and a pair of long stockings, or the Snively combined drawers and stockings. The night-dress should be pulled up under the arms and properly fastened there to prevent its being soiled by the discharges; at the same time a sheet, folded once, should be neatly pinned around the patient's waist. This should be arranged in such a way that it can be easily removed along with the Kelly pad or ordinary obstetrical pad after the completion of labor. Then the patient should be covered with an ordinary sheet and as many bedclothes as are required.

Presence of Husband.—It occasionally happens that a husband desires to be present during labor, although why he should do so I could never understand. My custom is generally to allow him to be present if he wishes during the first stage, although I much prefer his absence. He can do no good and is apt to be intensely alarmed on account of his wife's sufferings. Under such circumstances he becomes sometimes almost an intolerable nuisance, and it will keep one pretty busy assuring him that this is not the first time in the history of the world that a woman has suffered so severely. During the progress of the second stage I generally say, quietly, "You had better leave the room now, we are getting near the end," without giving any reasons why. He almost invariably leaves when so instructed without making any trouble. If by any chance he should insist upon remaining, I have nothing more to say.

Rupture of Membranes.—Rupture of the membranes may occur at any time during the labor or before labor has commenced, but under ordinary circumstances should take place about the end of the first stage or at the commencement of the second stage. Very often such rupture may be said to be the dividing line between the first and second stages. In a large proportion of normal cases the history is somewhat as follows: labor advances steadily until the child is in proper position for expulsion and the mother's soft parts are sufficiently softened and dilated to allow the passage of the child, the membranes suddenly rupture, pains become more frequent and more vigorous and the child is soon expelled. Sometimes it happens that such rupture does not take place without artificial interference. Under such circumstances the doctor may cause the rupture by pressing with the finger end. Years ago he was advised to do so with his finger-nail, sometimes sharpened specially for the purpose. As we now prefer to have short finger-nails we must use the finger-tip or some hard instrument. An ordinary surgical probe answers well. If no probe is procurable a coarse hairpin may be used; first straighten it and then hold it for a long time in a flame; after it is thus sterilized it should be passed along the finger-tip as a guide and pressed against the bag of membranes during a pain. In rupturing the membranes in this way it is well to hold a soft bichloride towel closely against the vulva to receive the gush of waters and prevent soiling the bed.

MANAGEMENT OF THE SECOND STAGE

During the first stage the patient has been allowed, during the greater part of it at least, to sit, stand or walk pretty much as she pleased; in the second stage she should not be allowed any such liberties. She should not be allowed to leave her bed even for evacuation of the bladder or the bowels, because of the danger then existing of sudden expulsion of the child.

The pains in the second stage are changed in character. The ordinary uterine expulsive efforts are assisted by certain of the voluntary muscles. The patients are very apt during these pains to brace their feet and pull on something near them, frequently on the hands of some bystander. These voluntary efforts assist to some extent in the expulsion of the child, but in the so-called precipitate labors may do a certain amount of harm. It is well, as a

rule, to make an effort to regulate these voluntary efforts. When it is desirable to hasten labor she is directed to press her feet against something and at the same time pull on a sheet attached to the foot of the bed. She is told to hold her breath and make full use of the accessory powers during each uterine contraction. When, on the other hand, the uterine contractions are already too strong, she is directed to cry out during pains instead of holding her breath.

In addition to the ordinary pains accompanying the uterine contractions the patient may have cramps in the lower limbs which add much to her suffering. Such cramps may be overcome by powerfully contracting the antagonistic muscles. For example, in case of cramps in the calf of the leg the patient should forcibly flex the foot and hold it so until the muscular spasm subsides, at the same time the cramped muscle should be well rubbed by the doctor or nurse.

Sometimes the ordinary pains are extremely acute in the sacral region. These may be relieved to some extent by firm pressure of the palms of the hands against the sacrum during the uterine contractions. To apply such pressure is generally supposed to be one of the duties of the nurse, and is sometimes onerous in character in a prolonged second stage. When the patient finds that such pressure furnishes a certain amount of relief she will insist upon having it during every pain.

It not infrequently happens that an abdominal binder firmly applied may slightly relieve these pains. Such binder may also assist expulsion, especially in multiparæ with pendulous bellies.

When the head begins to distend the perinæum, the patient should be watched with great care. Some recommend that at this time a pillow should be placed between the knees to support the thighs or that somebody should lift up the right knee. I do nothing of this sort as a rule, but occasionally, when the patient appears to feel instinctively that expulsion may take place more readily with the thighs separated, I use the pillow or the hands of an assistant as recommended.

At this time we have to keep several things in view. We should watch the patient's voluntary efforts, make her hold her breath when necessary and bear down, or ask her at critical moments to cry out and stop bearing down. We should watch the perinæum and vulva as they are being distended. We should keep the parts as clean as possible.

During the whole of the second stage the vulva should be covered with a diaper, pad, or towel which has been soaked in an antiseptic solution, preferably a lysol or bichloride solution. Before each examination the vulva should be again washed, and after an

Fig. 64.—Bladder Empty before Labor.

examination a fresh pad if possible, or at least a pad freshly soaked in the antiseptic, should be reapplied.

In spite of all precautions the descending head may press some fæces from the rectum. These should be carefully wiped away with a piece of cotton or a pledget of wool soaked in the lysol solution. In using any such pledget be careful to pass it from before backward so as to wipe from and not toward the vulva. Each pledget, after being used, should be thrown into the slop-pail or basin.

Hot fomentations or oily preparations have sometimes been used to help relaxation of a perinæum when very rigid. I am very doubtful, however, as to the efficacy of any such applications.

Before making any special reference to the management of the perinæum and pelvic floor it should be noted that this is a very

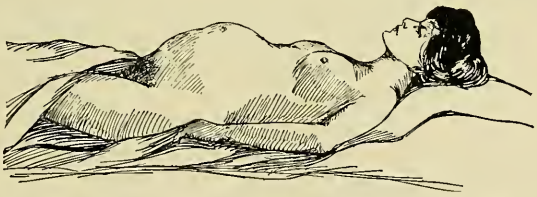


Fig. 65.—Bladder Full during or before Labor.

critical time in the process of labor. One should be keenly on the alert to do all in his power to assist his patient without doing her any harm. There is no time in our professional career when it is more important for us to be what the world calls "calm, cool and collected." A careful study of all the steps in this stage, all the details in management and nursing, and all the precautions to be

taken from an aseptic or antiseptic standpoint should give us a knowledge which will enable us to conduct properly any normal case without serious difficulty.

Management of the Perinæum.—Many procedures which have been recommended by various so-called authorities instead of effecting any good do a positive injury. One of the most harmful of such procedures is what is called "supporting the perinæum." I believe it is a great deal easier to do too much than too little at this time.

Fig. 66.—Controlling Passage of Head through Vulva, One Hand passed between the Thighs.

It was stated in connection with the mechanism of labor that after the head passes downward and backward in the pelvic cavity for a certain distance it turns rather sharply forward and continues in this new direction until it emerges from the vulva. During this part of its descent it presses against the floor of the pelvis and the perinæum and may do more or less injury to these structures. Such injuries are more likely to occur in first labors. It is estimated by some that lacerations of the pelvic floor and perinæum occur in 40 per cent. of first and 15 per cent. of subse-

quent labors. Such injuries have frequently very serious effects. A strong, healthy young woman may give birth to a healthy child and may make a fairly good recovery. She and her friends are perfectly satisfied with her condition for a time after labor, but even under such apparently favorable circumstances the pelvic floor may be so severely injured as to cripple her for the rest of her life. It is probable that at least half of such injuries might be avoided by careful and judicious methods of management. Many lacerations of the pelvic floor, which ought to be readily apparent to any one who looks for them, are not recognized because they are not properly looked for. In first labors the fourchette is generally torn, a slight rupture of the perinæum is also quite common and is generally observed. A complete rupture of the perinæum

Fig. 67.—Controlling Passage of Head through Vulva, Both Hands behind Thighs.

passing through to the rectum occasionally occurs, and is, of course, generally observed, but in a large proportion of cases serious injuries take place in the pelvic floor which are not recognized.

A certain amount of time must elapse before the pelvic floor

and perinæum are in a condition to allow the child to pass with safety. After the uterine contractions have continued for a certain time the pelvic floor begins to bulge. It may look to a begin-

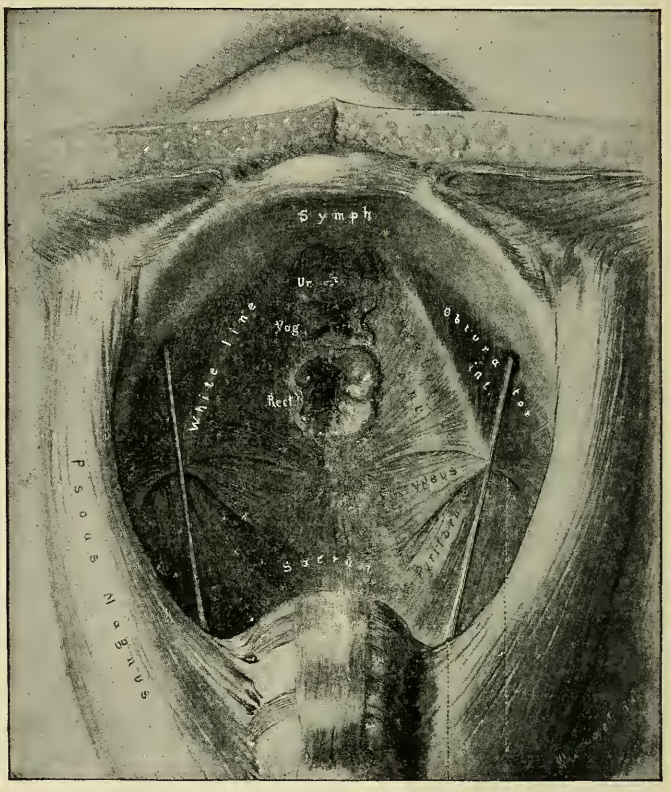


Fig. 68.—The Pelvic Floor seen from Above (Kelly).

ner at this time as if labor ought to be concluded very quickly. It is undesirable, however, to have the head expelled for at least half an hour after such bulging commences in primiparæ, and probably about twenty minutes in multiparæ.

Position of the Patient.—The patient may lie either on her side or on her back during the first and part of the second stage. As soon as the head is found to distend the pelvic floor and perinæum the patient should be placed on her left side, with her buttocks near the edge of the bed and her thighs and legs flexed. The pelvic floor and perinæum are now in plain view and should be kept so

until the head and shoulders are expelled. The physician stands at the side of the bed with his face toward the foot, having the right hand ready to use pressure from behind and the left ready to manipulate the vertex, the left forearm resting on her right or uppermost thigh. As a rule, especially when the thighs are flexed, both hands can be kept posterior to the thighs and buttocks; but when the patient is restless or the thighs are extended so as to be in a line with the body, it is better to have the nurse hold up the right leg and pass the left arm over the mons veneris and between the thighs to the vulva. This position is sometimes awk-

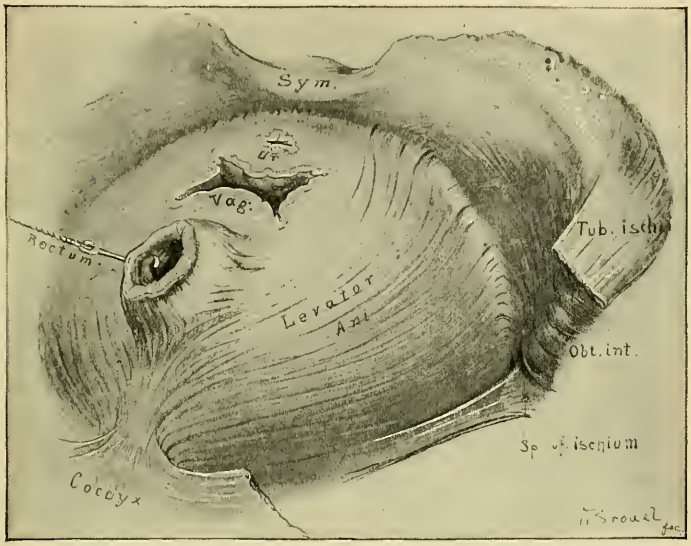


Fig. 69.—The Pelvic Floor seen from Below (Kelly).

ward, but it affords a good opportunity to completely control the patient. In doing this the hand should be wrapped in an antiseptic or aseptic towel while it is passing over the mons veneris to prevent it from becoming infected.

The bladder should be empty at this time, because fulness of this organ may considerably prolong the second stage. During the strong pains of this stage chloroform may be administered to the obstetrical degree.

When the head presses with some force, as shown by the bulging of the pelvic floor and perinæum, an effort is made to prevent lacer-

ation in the following way. The accoucheur puts a clean towel over the anus and presses with the heel of the right hand between the anus and the tip of the coccyx in such a way as to push the head forward toward the symphysis pubis; and places the thumb and fingers of the left hand over the vertex, seizing the latter if he can.

One thus gets good control over the head. It is very much as if a person had one hand over the vertex and the other over the chin and mouth without the intervention of the perinæum and pelvic floor. One gets still better control over the head as it is passing

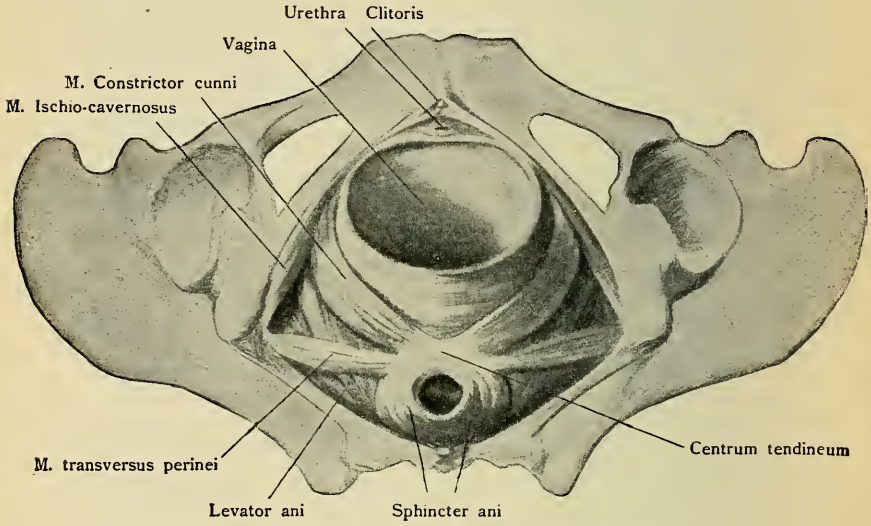


Fig. 70.—Pelvic Floor distended by presenting Part, showing Superficial Muscles of Perinæum (Bumm).

through the vulva by seizing it with the left hand over the occiput and the right hand over the forehead in front of the fourchette. In this way one can prevent undue extension and too rapid advance of the head, while he keeps part of the heavy strain off the pelvic floor and the perinæum.

If, at this time, the perinæum seems in danger, as shown by undue tightening of the skin around the vulva, the patient is directed to extend the legs and thighs so as to bring them in a straight line with the body, such procedure having a tendency to considerably slacken the tension around the vulva. A backward arching of the patient's back also assists in relieving such tension.

When the pelvic floor, perinæum, and vulva seem sufficiently softened and dilated, and the head sufficiently far advanced, one may hold it steadily with two hands, and gently slip it out during an interval between the pains. When this can be done there is sometimes less danger of laceration than when the head is expelled during the acme of the muscular contractions. Some prefer to put the thumb or fingers of the right hand in the rectum instead of

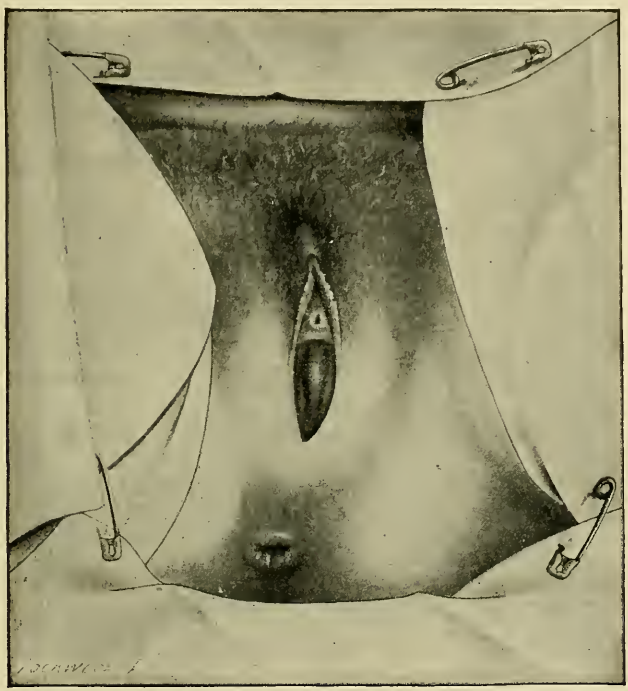


Fig. 71.—Birth of Head, Scalp appearing at Vulva (Williams).

behind the anus. This method, while no more efficient than the other, perhaps not so much so, is obviously objectionable. As soon as the head is expelled or extracted the right hand is moved forward to support it and the left is placed over the fundus uteri.

Emergence of the Head and Neck.—When the head is born the neck is examined to see if there is a loop of cord around it. When one or more are found the loop or loops are slipped over the head.

If the cord is too tight to allow this the loop is passed over the shoulders as they emerge. If neither one of these can be done the cord is cut with a pair of scissors, and a clip is put on each divided end, or, if there are no clips at hand, the proximal end, which is

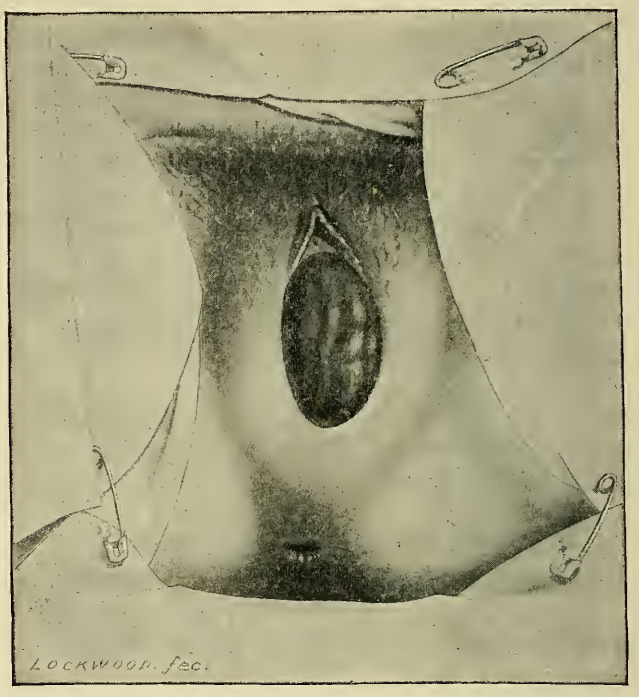


Fig. 72.—Birth of Head, Vulva partially distended (Williams).

recognized by the spouting of two umbilical arteries, is held between the thumb and index finger until it can be tied. While the physician is thus manipulating the cord the nurse should press with some force (not too much) over the fundus uteri.

The child's face, after expulsion of the head, is at first white or somewhat pale, but soon becomes purple. This may cause alarm in the beginner, but it generally involves no special danger to the child. The head is now the only part of the fœtal body free from pressure and, consequently, the blood rushes into it and is prevented from returning freely to the body by the pressure about the neck. There is danger, however, sometimes. If the child's face

remains purple during the interval between the pains there is certainly danger of asphyxiation. If a ligature has been put on the cord there is also danger of asphyxiation. When such danger exists one should extract quickly. If there is no prolonged congestion of the child's face, and no cord complication, one should generally wait until the child is expelled by Nature's efforts.

The inexperienced physician or midwife is apt to get flurried at this time and make injudicious efforts to extract the child. Rapid extraction of the shoulders, under such circumstances, frequently causes serious lacerations, and sometimes inflicts serious injuries to the child's spine. It is quite right for the physician to assist ex-

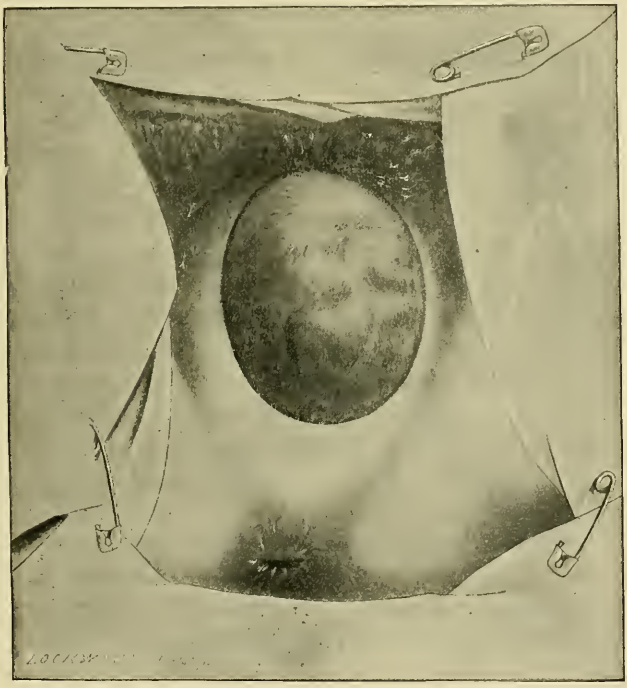


Fig. 73.—Birth of Head, Vulva completely distended (Williams).

pulsion by rubbing or kneading the uterus or by pressure with the hand over the fundus. Generally with such slight assistance the shoulders descend, rotate, and emerge quickly. After the expulsion of the shoulders the remaining portion of the body follows

rapidly. As soon as the shoulders are expelled the patient should be turned on her back.

Quick Extraction of Shoulders.—When interference becomes necessary for the extraction of the shoulders one of two methods may be employed.

1. Hook the finger in the posterior axilla from behind and lift the shoulder over the edge of the perinæum, while the anterior

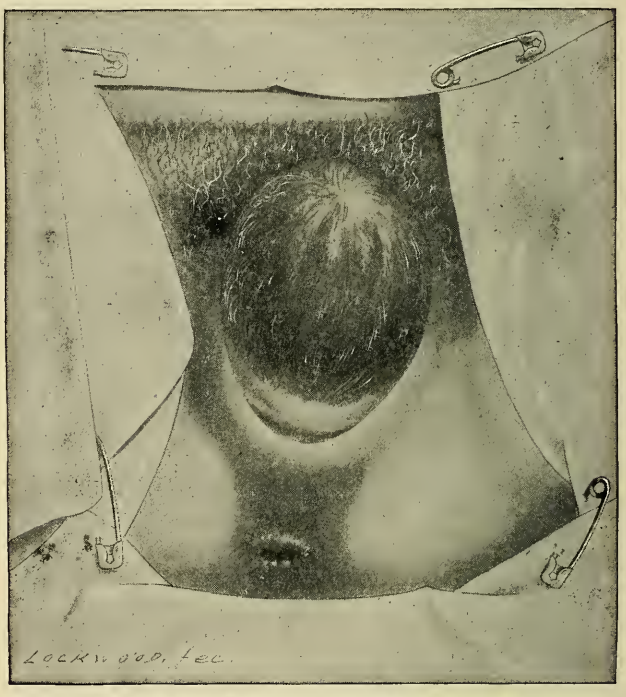


Fig. 74.—Birth of Head, showing Delivery by Extension (Williams).

shoulder still rests behind the symphysis. Gently extract the posterior arm. The anterior shoulder will now pass easily under the pubic arch. At the same time the assistant should press over the fundus.

2. Push the neck backward against the perinæum and pull slightly so as to bring down the anterior shoulder; then push the neck forward, pass the finger under the posterior axilla and extract.

There is generally or always danger of asphyxiation when two pains have occurred after the expulsion of the head.

Sometimes the ovum is expelled intact—that is, with the child completely enveloped in the membranes. In such cases the membranes should be ruptured at once to prevent the child from being smothered. The membranes over the head, under such circumstances, are known as the "caul." In former days a caul used to be considered very lucky, and was not uncommonly sold for a large sum of money. I think the expulsion of an intact ovum is more common in twin labors, the first child being delivered after rupture of the membranes in the ordinary way, and the second being delivered surrounded by its unruptured membranes.

Tying the Cord.—In former days, when it was the fashion to keep the patient on her side until after the expulsion of the placenta

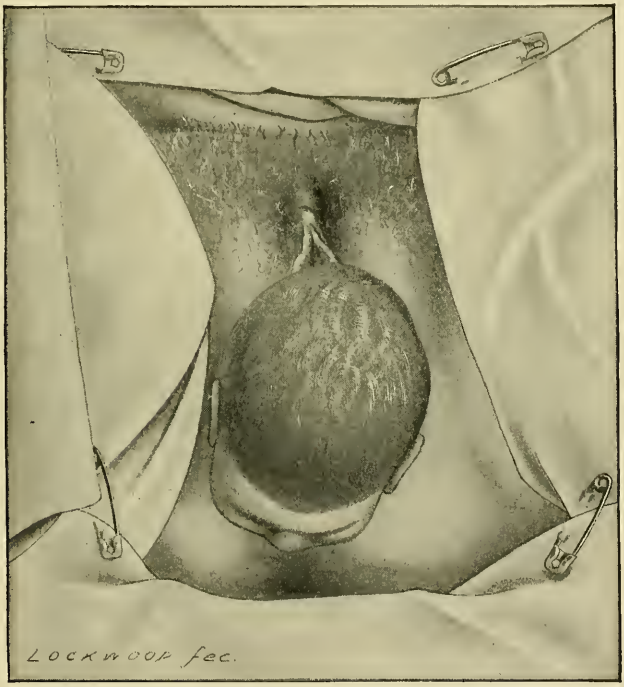


Fig. 75.—Birth of Head, Face falling backward toward Anus (Williams).

the child was simply placed on the bed, below or behind the patient's buttocks, and remained there until after the ligaturing and division of the cord. If, however, the patient is placed on her back, as I strongly recommend, before the complete expulsion of

the child, it is not quite so convenient to care for the latter. If the cord is fairly long the mother may flex the right thigh and leg while the child remains under the right knee or close to the outer side of the thigh; or, the patient may separate the thighs and the child be left between the knees. The position of the mother on her back after the completion of the second stage involves a certain amount of exposure, but this is a small matter when compared with the

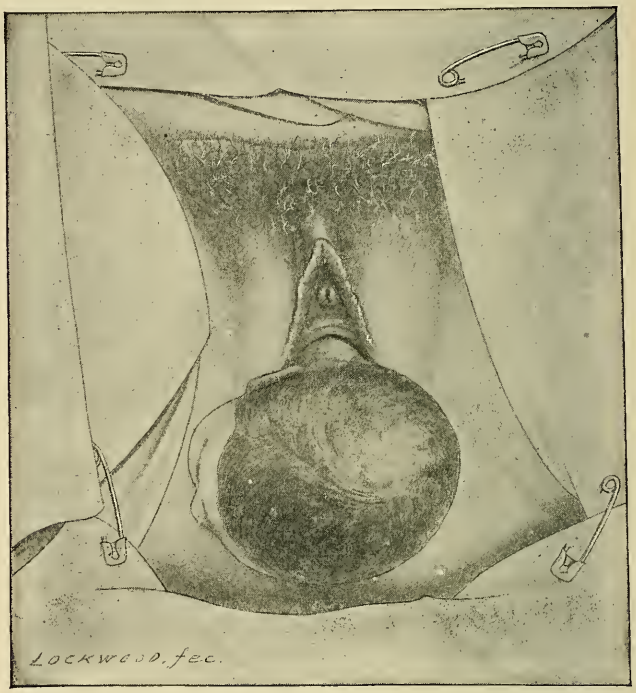


Fig. 76.—Birth of Head, External Rotation (Williams).

benefits to be derived. While waiting to ligature the cord still keep the left hand on the fundus uteri. I repeat this direction somewhat frequently on account of its importance; at the same time I wish again to insist upon it that there should not be any rough kneading or strong pressure used.

It is now generally recognized that we should wait for some time after the birth of the child before tying the cord. During this time the fœtal circulation is well aspirated, especially after the child has cried. It is probable that during this process of aspira-

tion the child gains two or three ounces of blood. It is thought by some that the diminution in the size of the placenta through the abstraction of this blood is one of the causes of the separation of the placenta from the uterine wall. Some say that we should wait until the cord ceases to pulsate. I do not know how long this might take in certain instances, but I make it a practise not to wait any longer than five minutes, especially if the child has cried. The physician should see that there is no protrusion of the bowel in the cord.

FIG. 77.—SOUDAN LABOR CHAIR.
(Photograph by James F. W. Ross.)

When the cord is thick one may squeeze some of the gelatinous matter toward the placenta. This is called stripping the cord and is to some extent dangerous

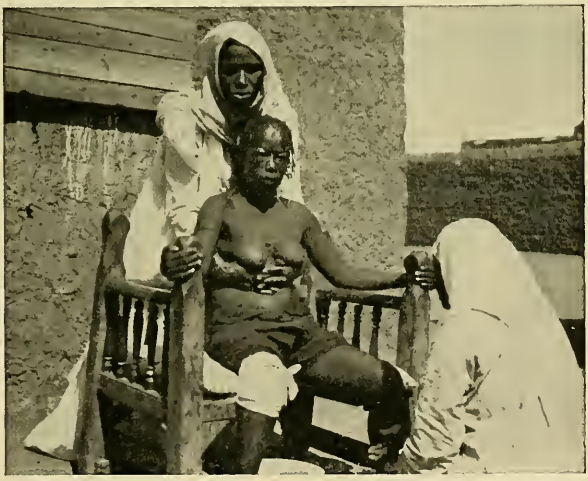


FIG. 78.—DEMONSTRATION OF THE METHOD OF CONDUCTING LABOR IN SOUDAN, AFRICA.

Patient in labor chair in the grounds of the Civil Hospital in Obdurman, opposite Khartoum. Hospital behind with part of the surrounding wall visible on the right. Woman behind "helping" patient. Native midwife "waiting." (From photograph taken by Dr. James F. W. Ross, with the permission of Dr. Christopherson, Superintendent, February, 1904.

because it is liable to do violence to the navel. The safer plan is to simply squeeze the cord at the spot where the ligature is applied.

After the cord has been tied and cut, the nurse may take the babe, or it is sometimes more convenient for the physician to do so, and hand it to the nurse. This should not be done in a clumsy and awkward manner. A child covered with the vernix caseosa is

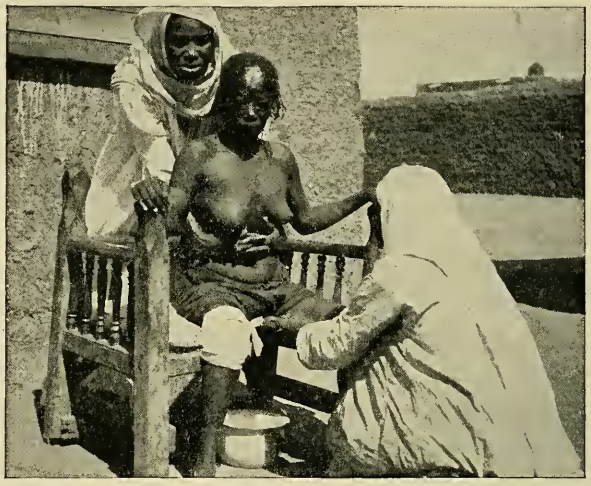


Fig. 79.—Native Midwife holding out her Hands to receive the Babe.

(From photograph by Dr. Ross.)

sometimes rather slippery and therefore difficult to hold. It will not inspire confidence on the part of the onlookers if the child is allowed to fall to the floor. I always pick up the child in a definite way as described by Uzziel Ogden. Place the left hand under neck and shoulders so that the thumb and index finger support the head, and let the thumb, index, and middle fingers of the right hand seize the thighs immediately above the knees, the index finger being between them. Or the hands may be reversed.

CHAPTER VII

NORMAL LABOR (Continued)

THIRD STAGE OF LABOR

Credé's Method.—About fifty years ago Credé introduced into Germany a certain method of expressing the placenta without any suspicion apparently (according to Robert Barnes) that the same method had long been practised in Great Britain. It was practised especially in Dublin and the procedure was minutely described by McClintock and Hardy in 1848. About the time that obstetricians of Great Britain were learning the dangers of rapid expulsion, physicians of the continent, United States, and Canada were, as a general rule, practising the Credé method. The important difference between methods in vogue in the middle of the last century may be best understood by the use of two words—extraction and expression. The older method of extraction in the course of years gave way to that of expression. The Rotunda school of Dublin was the first in the world to adopt expulsion or expression.

In a few years many of the disciples of Credé on the continent, and those of the Rotunda in Great Britain, discovered that rapid expulsion was frequently followed by evil results. One of the first in Canada, and perhaps in North America, to recognize the evils of rapid expulsion was George A. Tye, of Chatham, Ontario. After carrying out for some years the original Credé method he relinquished it in 1887, and adopted almost in its entirety the expectant method. There was, during all these years between 1850 and 1887, some doubt and uncertainty as to the exact nature of the methods of expression. Fortunately we are able now to lay down definite rules as to the conduct of the third stage of labor which are generally considered correct by obstetricians in all countries.

What was Credé's method? Some confusion has arisen as to this term from the fact that Credé himself, after some years, made an important change in his method. His practise, in the earlier

years of his work especially, was to apply friction to the uterus as soon as the child was expelled. When the first uterine contraction occurred he grasped the fundus in his hand with the thumb on the anterior wall and the four fingers on the posterior wall and thus squeezed out the placenta—"as the seed from a ripe cherry compressed between the thumb and fingers." His aim was to complete the operation as soon as possible, and according to some of his earlier statistics the average duration of the expression was four and one-half minutes. This method was popular for years, although many opposed it. After a time the opposition grew stronger and a complete reaction set in. It was then condemned as harsh and unscientific. The adverse criticisms, which became so common at this time, were essentially correct. In the hands of many, if not the majority, the method of expression was extremely harsh and caused much unnecessary pain. Too much attention was given to the rapid expulsion of the placenta and too little to the expulsion or extraction of the membranes; as a consequence large portions of the latter were frequently left in the uterus. The rapid expression of the placenta emptied the uterus before retraction and contraction were properly established. Under such circumstances accoucheurs were likely to meet with two conditions, inertia of the uterus and retention of membranes, which together favored post-partum hæmorrhage, and yet Credé's chief aim was to prevent such hæmorrhage.

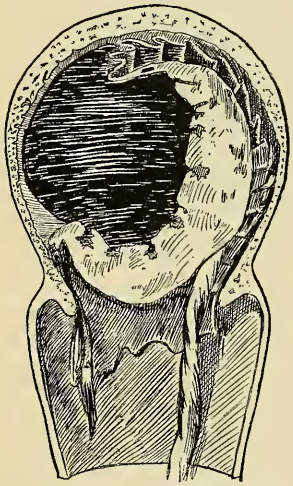


Fig. 80.—Placenta in Uterus after Birth of Child.

It is somewhat remarkable that results so varied should follow any one plan of treatment. It is probable that in the hands of Credé and his assistants the results were fairly satisfactory, but the bad results were very serious in the practise of many who were either unskilled or improperly taught.

Credé himself, after practising his methods some years, recognized certain defects and accepted the rule that no one should endeavor to squeeze out the placenta until at least fifteen minutes

had expired after the expulsion of the child. This extremely important modification of Credé's original method is a great improvement, and while it makes the plan almost perfect in the opinion of the great majority, will account for some of the misconceptions which have appeared in the numerous discussions which have taken place on this subject.

Elements in the Third Stage.—We have received some very valuable lessons from Dohrn and Ahlfeld in Germany, and also from the Edinburgh and Dublin schools in Great Britain. We now know that there are two separate and distinct elements in the third stage of normal labor.

1. The spontaneous separation of the placenta and membranes.

2. The delivery of the placenta and membranes.

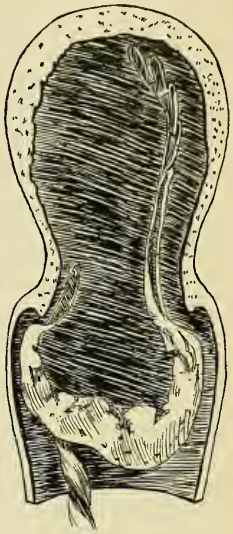


Fig. 81.—Placenta Separated and pushed partially into Vagina.

The Dublin and Credé schools taught us that the old method of removing the placenta by pulling on the cord was wrong. Careful observers during the last twenty years have discovered that we should allow Nature to complete the separation of the placenta and membranes without any of that violent rubbing and kneading which used to be done immediately after the expulsion of the child. This process of separation is generally completed in from fifteen to thirty minutes, probably in the majority of cases in less than twenty minutes. As soon as the separation takes place the placenta is pushed by the ordinary uterine contractions wholly or partially into the vagina, and in a certain indefinite time thereafter is generally expelled from the vulva. I think it was Ahlfeld who first pointed out that this separation and expulsion of the placenta into the canal of delivery are shown by the advance of the cord and by the firm continuous contraction and retraction of the uterus, which, while becoming more narrow, generally rises somewhat higher in the abdominal cavity and at the same time becomes more mobile. This apparent lengthening of the cord is clearly shown if one follows the Rotunda plan of putting a second ligature on the

cord close to the vulva. When the placenta passes wholly or partially into the vagina this vulvar ligature passes about two inches downward.

Although violent rubbing and kneading of the uterus immediately after expulsion of the child is harmful we should not go to the other extreme of leaving the uterus to look after itself. One should keep the left hand on the uterus, pressing gently or rubbing gently with the tip of the finger between the recti muscles. If, however, serious hæmorrhage should occur at this time we shall generally find feeble contractions. In such a case the uterus should be grasped firmly so as to induce a contraction and

Fig. 82.—Placenta being Expelled.
Nurse holding plate to receive it.

arrest the hæmorrhage. As soon as separation and slight downward movement of the placenta have occurred, pressure should be made over the fundus in the way described by Credé or with the palmar surface of the two hands, the fingers interlocking each other. The placenta can generally be pushed out during the first firm contraction; if not, pressure should be continued during each subsequent contraction. Slight traction on the cord in conjunction with pressure on fundus is sometimes allowable when the placenta is partially or wholly in the vagina. Caution is, however, always required. If pressure during three or four contractions does not expel the placenta there is probably some abnormal condition.

Extraction of the Membranes.—After the expulsion of the placenta, we have to consider the extraction of the membranes. The term extraction, as distinguished from expulsion, is used advisedly. It is a very common practise to continue pressing on the uterus and at once commence turning the placenta so as to twist the membranes into a cord. I believe the result of this method is frequently

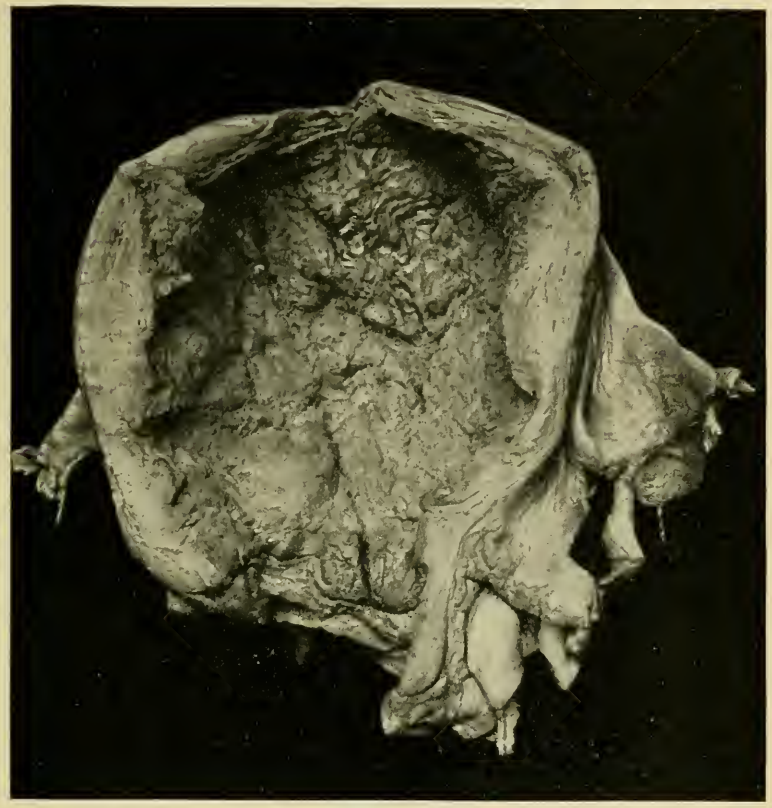


FIG. 83.—PLACENTAL SITE NEAR FUNDUS, ROUGH AND PROMINENT, OFTEN MISTAKEN FOR PORTION OF RETAINED PLACENTA. (Tor. Univ. Museum.)

to tear through the membranes while a considerable portion of the same is retained in the uterus. We are so thoroughly imbued with the *vis a tergo* idea in connection with the delivery of the child and placenta that we are apt to forget that the extraction of the membranes should be effected by an entirely different process.

Plenty of time should be taken in this procedure, not less than five to ten minutes. The accoucheur should not drag away the membranes rapidly. On the other hand, he should support the placenta

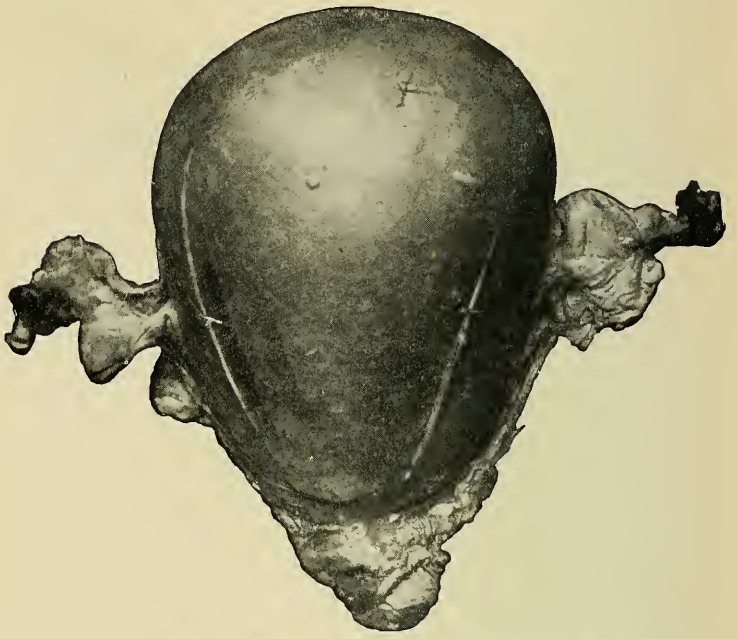


Fig. 84.—Pregnant Uterus at Seven Months.
Note the height of the fundus above the Fallopian tubes.

in such a way that it will not pull forcibly on them. He should watch for slight relaxation or dilatation of the uterus and during such coax them away. If one detects a slight tear on one side he should pull gently on the other. A little judicious twisting may assist sometimes, but one should remember the dangers connected therewith and beware. During the delivery of the placenta and the extraction of the membranes the nurse should hold the soup-plate or platter, which has been set aside for this purpose, between the thighs pressed against the perinæum to receive the placenta, the gush of blood which generally follows it, and the membranes. If no abnormal condition is present it is quite unnecessary to introduce the fingers or hand into the vagina or uterus during the third stage of labor. The objections to such procedures are not based on mere inutility, but on the fact that this is the period when

there is the greatest danger of introducing septic matter into the system. The passage of the child has produced tears of greater or lesser extent in the cervix, vagina, and perinæum, or perhaps in all three combined, and the open-mouthed blood-vessels and lymphatics are ever ready to absorb and distribute through the body any poison which comes within their reach.

Without discussing at length the physiology of placental separation and expulsion, we may presume that the detachment of the placenta is caused by contraction in the area of its insertion, in which contraction the placenta itself can not share. Separation occurs probably in different ways, varying according to the positions of the placental insertion. When inserted at the fundus it begins to separate at the center, forming a cavity in which a certain

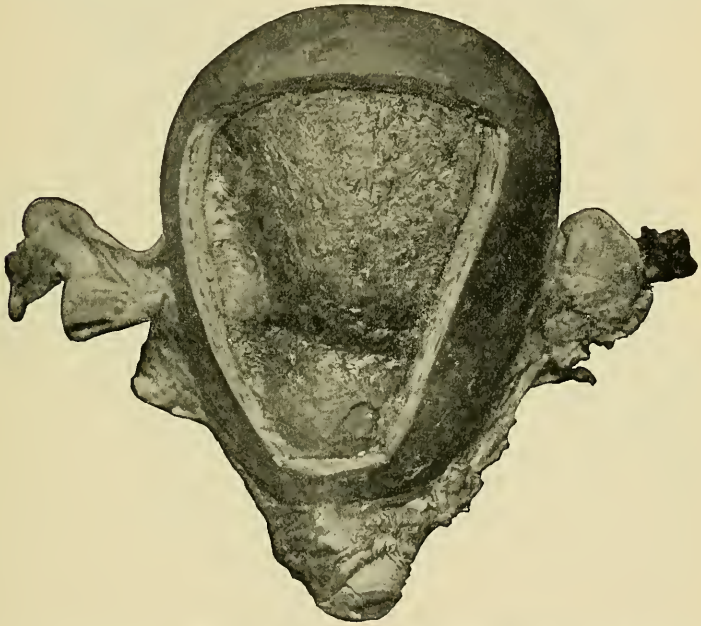


Fig. 85.—Pregnant Uterus with Front Wall removed showing Section of the Uterine Wall, Large Surface of Placenta with Uterine Surface of Membranes below and to the Left.

amount of blood accumulates. When separation is completed the fœtal surface of the placenta falls toward the cervical canal and the membranes follow, being turned inside out and containing a

certain amount of blood. The placenta and membranes emerge in the same order from the vulva. When the placenta is inserted in the anterior or posterior wall the separation begins either at the

Fig. 86.—Placenta and Membranes turned to the Left showing Section of Placenta, Fœtal Surface of the Placenta, Cord, and Fœtus.

upper or lower edge and as it descends it may appear at the vulva by its fœtal or maternal surface. The lower the insertion the more apt is the maternal surface to present at the vulva. These views do not coincide with those of Matthews Duncan and others, who thought that when there was no interference the common method of separation was such that the edge of the placenta presented at the cervix. The practical point to bear in mind in this connection is that when traction on the cord is employed before the placenta is dislodged from its place of insertion the initial separation is central, a partial vacuum is thereby produced which sucks the blood from the larger uterine vessels or tends to invert the weak and flaccid uterine walls. This generally admitted fact furnishes the strongest and most convincing argument against the pernicious practise of early traction on the cord.

There are three objects gained by the modern or modified Credé's method.

1. By maintaining retraction and contraction of the uterus it prevents hæmorrhage.

2. By causing comparatively rapid expulsion it tends to prevent the dangers arising from retention.

3. By thoroughly emptying the uterus without introducing the fingers into the genital canal it tends to prevent septicæmia.

The Membranes.—As already stated, the membranes do not, as generally supposed, form the sheath of the cord. The external

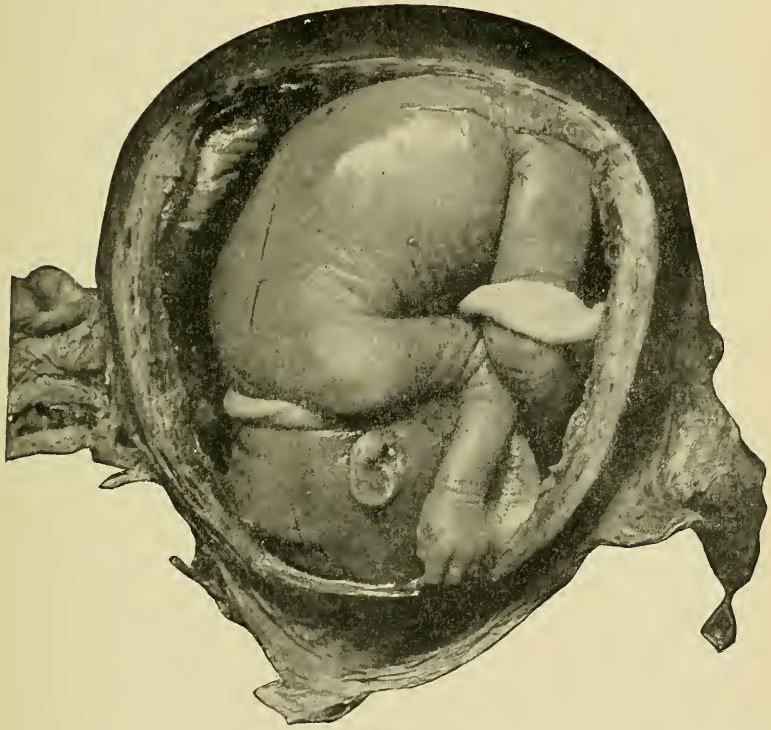


Fig. 87.—A Pregnant Uterus with Posterior Wall removed showing Section of the Uterine Wall and Fœtus in Position, with Cord around Neck and Thigh.

layer of the cord is really the skin of the embryo, as pointed out first, I think, by Minot. On examining the membranes one finds the two layers, which can generally be easily separated. When the

membranes are not inverted, that is when they are *right side out,* the chorion is the external or outermost layer and is continuous with the edge of the placenta. The amnion is internal or innermost. One may strip the amnion from the surface of the placenta as far as the root of the cord and no further. This clinical fact has been noticed by such men as Galabin and others, although Berry Hart speaks of it as if it has been entirely overlooked until very recently. Its full significance, however, has been only lately understood.

One should be able in almost all cases to distinguish the chorion from the amnion. The chorion has a rough outer surface which is due to the portion of the decidua which remains attached to it, the amnion, on the other hand, is smooth on both sides and is thinner but stronger than the chorion.

In further examination one should endeavor to decide whether all the membranes have been expelled or not. There should be enough present to have enclosed the fœtus, making some allowance for a certain amount of shrinking due to their elasticity. In looking for the layers it may be noted that the chorion wholly or in part is more likely to be left in the uterus than the amnion. When the chorion has come away the amnion is not likely to be left behind. In a certain number of cases, however, the amnion may be torn away from the edge of the placenta and separated from the chorion when it has been carried down as a bag descending far in advance of the head.

There is considerable difference of opinion among eminent obstetricians as to the proper procedure when there is simply a suspicion of the retention of a portion of membranes or placenta.

For instance, Galabin, who is careful and conservative, tells us that if any portion of the placenta or membranes appears to be absent it must be sought for within the uterus and removed. Jewett, on the other hand, who represents the views of a large number of American obstetricians, expresses the opinion that fragments of membranes remaining wholly in the uterine cavity are, as a rule, better left to be expelled with the lochial discharges unless they give rise to hæmorrhage. We should, of course, in all cases prefer to be certain that the placenta and membranes have been expelled entire. In cases of doubt the introduction of the hand within the uterus, the exploration of the cavity, and the removal of its contents, whether they be bits of placenta, mem-

branes, or clots, would seem to be the correct and thorough method. Unfortunately, however, such introduction of the hand adds very materially to the danger of septicæmia.

If the labor has been properly conducted no saphrophytic or parasitic (pathogenic) microbes will have been introduced into the uterus, and consequently small fragments of membranes and placenta are not likely to cause septicæmia. One is not justified, however, in leaving large portions of the placenta or membranes within the uterine cavity.

The following rules are recommended:

1. When one suspects that small portions of placenta or membranes are retained in the uterine cavity the introduction of the hand is not necessary.

2. When one suspects or is certain that considerable portions of placenta and membranes are retained the hand should be introduced and the uterine contents removed. In carrying out such procedure it is necessary to use both antiseptic and aseptic methods as to the hand introduced, the vulva, adjacent parts, and the vaginal canal. In certain cases, when the membranes are only partially retained within the uterine cavity and a certain portion projects into the vagina, the safest procedure is to seize it with a dressing forceps and extract, using torsion carefully—as recommended by Dürhssen.

3. If on the second, third, or fourth day, or even at any subsequent time, there is reason to suspect that the retained débris is causing mischief, and especially if the discharges are offensive, the interior of the uterus should be thoroughly explored and properly treated.

The Administration of Ergot.—Ergot was at one time very commonly administered during labor, and was supposed to be fairly safe and efficacious in the latter part of the first stage when the child was in good position, the presenting part low down, and the soft parts well dilated.

I remember one case which happened during my first year of practise in Toronto. The patient was a healthy primipara. The head had been on the perinæum for something like two hours; the parts were well dilated. My proper course was clear. I should have used the forceps, but I was somewhat timid, and the patient and her husband both objected to the use of "instruments." I gave one dose of ergot, and a second in fifteen minutes after. In

due time I noticed a strong pain coming on. This rapidly became more severe. I soon found, to my dismay, that the patient was simply having one extremely severe and continuous pain (tonic contraction), without the slightest expulsive action on the part of the uterus. Fortunately I had sense enough to apply the forceps at once and deliver the child without any difficulty.

A certain proportion of obstetricians, even at the present time, administer ergot before the expulsion of the placenta. In a fairly large proportion of cases it is probable that such administration does little harm or good, but in certain cases it does positive harm. If the placenta can not be expelled in an hour it is either *adherent* or simply *retained*. For adherent placenta ergot is absolutely useless; for simple retained placenta ergot is likely to do more harm than good, because it may produce a tightening of the muscular fibers near the cervix which will cause an incarceration which is difficult to overcome. The contractions caused by ergot are tonic, not intermittent, in character. Ergot by mouth usually acts in fifteen minutes; hypodermically in four or five minutes.

It is better to watch the uterus for one hour after the expulsion of the placenta. It is not necessary during this time to use any violence, which is not only useless but harmful, on account of the extreme discomfort or pain which is produced.

CARE OF THE MOTHER AND BABE IMMEDIATELY AFTER LABOR

TREATMENT OF THE MOTHER

As external tears are especially dangerous from a surgical standpoint, it is important that the vulva and adjacent parts be washed or bathed with great care, as mentioned in the Rules for Antiseptic Midwifery. A warm antiseptic solution is the safest and should be applied as gently as possible, because the parts are more or less tender. These dressings should be sufficiently frequent. Some physicians direct the nurse to change the pads and wash the parts every four hours. Such a rule is faulty because it is frequently misleading. I once found a foul smell coming from a bed three days after labor. On examination we discovered that the discharges had passed through the vulvar pads into the bed. I was surprised, as I had great confidence in the nurse, and remarked

that the pads had not been changed sufficiently often. She told me she had carried out the routine rule prevailing in that hospital and had changed the pads every four hours.

Each vulvar pad should be removed if possible *before* it becomes saturated. If even a slight quantity of the lochia has passed into the bed the sheet should be replaced and the mackintosh or rubber sheeting washed. The frequency of the dressings should depend largely on the amount of the lochial discharges. Numerous changes may be required during the first twelve or twenty-four hours.

In cleansing the hands when there is blood on them it is better first to wash in cold water; soapy water does not dissolve blood readily. Clear water and perhaps a nail-brush should be used first, and water with soap next.

Injuries to the Perinæum and Pelvic Floor.—It is generally understood, as already explained, that laceration of the perinæum is apt to occur. It is not so generally understood that laceration of the pelvic floor or of the posterior wall of the vagina is also apt to occur. These injuries are discussed more fully in the chapter on Operative Midwifery. It should, however, be a rule in every case to make a careful examination with a view of discovering any such injuries and also their extent when they exist. When in doubt as to the extent of injuries to the pelvic floor the examination can be best carried out after placing the woman in the dorsal position across the bed with the thighs flexed upon the abdomen. It is better to have a nurse or other assistant hold the labia apart. One can then cleanse the posterior wall of the vagina with pledgets of cotton soaked in lysol solution, and leave a plug in the vagina to prevent the blood from running over this region during the inspection. In this way the tear of the perineal body, and also of the posterior vaginal wall or pelvic floor, can easily be detected and examined.

Abdominal Bandage.—An abdominal bandage is applied after the removal of soiled clothing. There has been considerable difference of opinion in the past as to the advisability of applying a binder. Something like forty years ago certain obstetricians in Paris dispensed with its use. Shortly after this Gaillard Thomas advised obstetricians not to use an abdominal bandage. It is now generally, but not universally, admitted that a binder should be applied in all cases immediately after labor. It adds much to a woman's comfort and allows her to turn upon her side with greater safety. It should be worn not merely while she is confined to bed,

but for some time after she begins to sit up. A bandage is generally ready at hand, but if not, one may choose unbleached muslin or ordinary factory cotton. It should be long enough to surround the body with a few inches to spare and wide enough to extend from the ensiform process to a point slightly below the trochanters.

In adjusting the bandage seize the near end between the thumb and two fingers of the left hand and draw the further portion smoothly over it with the right hand, then hold the two ends with the left hand and insert the safety-pins with the right. Insert the pins from below upward, taking care to draw the bandages as tightly as possible before inserting the lower two or three pins. The intervals between the pins should be about two inches. After inserting the lower two or three pins, I sometimes introduce the next pin immediately above the fundus uteri and afterward put one, two, or three pins in the interval which has been left. About six to eight pins should be used altogether. It is better, especially in country practise, where one has not, as a rule, many skilled nurses, to make it a point to apply the binder the first time himself, otherwise many women think they are neglected. Such being the case it is very important that skill be shown in the application of the binder. In carrying the bandage under the patient's back it is well to roll one-half and then pass the roll under the patient's back to the opposite side, then unroll. One should take care that there are no wrinkles in the binder under the patient's back.

Some are in the habit of placing a pad made of folded diapers, or something of that sort, over the abdomen before fastening the bandage with the idea of producing compression of the uterus. This is likely to do more harm than good, because the pad thus applied is apt to slip and then press the uterus out of place.

In some cases, however, when there is considerable hæmorrhage following the relaxed condition of the uterus, especially in a thin woman, it may be well to use something in the form of a pad, which is likely to assist in keeping the uterus contracted. The best method of doing this is the one which used to be adopted by James Ross, of Toronto. Make three rolls of three towels about as thick as the wrist, place one of them transversely just above the fundus uteri and the other two at the sides of the uterus and then fasten the bandage firmly over them. In this way the uterus, as Parvin expresses it, is enclosed in a box, the lid of the box being the portion of the bandage in front of the abdomen.

After the application of the bandage and the adjustment of the night-dress the patient should be dry and comfortable. One should make it a point to carry out all these details in as thorough and kindly a manner as possible. If a physician is careless and indifferent and inclined to leave all the details to the nurse, he will certainly not have pleased his patient, and I think will not have done his duty.

It is a good rule to remain an hour in the house after the delivery of the placenta. One should always keep in mind the danger of hæmorrhage. Post-partum hæmorrhage is generally due to relaxation of the uterus, but also occasionally to laceration of the cervix. Whatever be the cause one should always stay with his patient until such hæmorrhage is checked.

There is an old rule that one should not leave the house if the pulse is 100 or over. It is right to consider a rapid pulse as a danger signal, especially if it becomes rapid somewhat suddenly within a short time after the completion of labor. Sometimes, however, the pulse, for some reason or other, is 100 or thereabouts during the latter part of labor and remains rapid for some time after without any serious accompanying symptoms.

MANAGEMENT OF THE BABE

Dressing the Cord.—It is better to apply some antiseptic solution, such as one of lysol, wipe dry and then surround the cord with absorbent cotton. This will be kept in position by the abdominal bandage, which should be applied until the cord has come away. The stump or wound of the cord may be covered by uniting the edges of the skin of the cord (formerly called the amniotic sheath) with a running kangaroo or catgut suture.

The nurse generally looks after the babe from the time that it is lifted from the bed. Before giving the babe in charge of the nurse, however, for its first washing one should examine it very carefully with the following points in view:

Examine the cord for bleeding.

Examine the whole body for birthmarks, etc.

Examine the head for meningocele, etc.

Examine the back for spina bifida, etc.

Examine the limbs for talipes and other deformities.

Examine for imperforate anus.

Apparent Death of Babe.—1. When the face is dark in color and swollen, with perceptible action of the heart (*asphyxia livida*), the case is favorable. 2. When the face is pale (*asphyxia pallida*), limbs flaccid and no apparent action of heart, the case is unfavorable.

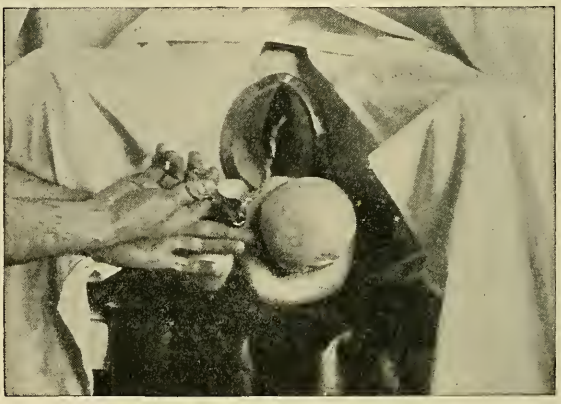


Fig. 88.—Cutting the Cord.

Treatment for Asphyxia.—The physician should adopt a definite line of treatment for the purpose of resuscitating a child partially asphyxiated or apparently dead. First, slap the front and back of the chest and then invert the child, holding it by the feet for two or three seconds. If these procedures fail, employ artificial respiration, of which the best methods are those of Sylvester, Byrd, and Laborde.

Atelectasis, a persistence of the fœtal condition of the lungs, is frequently associated with and may be the main cause of the asphyxia. This condition does not necessitate any change in our methods of resuscitation.

Fœtal death. Chapin distinguishes between the dead-born and the still-born babe. In the former the respirations and reflexes are absent, the pupils are widely dilated and the rectal temperature rapidly falls to 10° or 15° below normal.

DESCRIPTION OF METHODS OF ARTIFICIAL RESPIRATION

Sylvester's Method. Place child on its back, with a small cushion under its shoulders, so as to incline head slightly backward. Stand behind the child and seize an arm above the elbow

with each hand. Raise arms slowly above the head, at the same time rotating each humerus slightly outward. Keep them raised two or three seconds.

Next bring down the arms and press gently against side of chest two or three seconds.

Repeat these movements.

Byrd's Method. Lay the child on its back upon the palmar surfaces of your outstretched hands. Elevate the radial edges of your hands so as to double the child's trunk upon itself—to cause expiration. Then lower the radial edges well below the level of the ulnar borders of the hands so as to extend the child's body—to cause inspiration. Repeat these movements.

Laborde's Method of Rhythmic Tongue Traction. Seize tongue with catch forceps or by finger and thumb wrapped in a piece of

Fig. 89.—Artificial Respiration. Sylvester's Method. (First Part.)

cloth, and strongly draw it out of the mouth, then allow it to fall back into its normal position.

Repeat fifteen times in a minute.

In using these methods the different movements should not be

made too rapidly. Once in three seconds is sufficiently often for the methods of Sylvester and Byrd, and once in four seconds for that of Laborde. The methods of Sylvester and Laborde may be used in conjunction, one person drawing out the tongue while the other

Fig. 90.—Artificial Respiration. Sylvester's Method. (Second Part.)

is raising the arms over the head. Laborde's method may be used while the babe is held in a warm bath. These methods are useful, especially for full-term babes. Great care should be used in employing them for premature infants, for whom we often have to rely chiefly on the effects of heat. It is often necessary to clear the mucus out of the throat. This may be done with the simple rubber bulb and tube.

Direct Insufflation.—Mouth to mouth method. Place the child on its back, with head slightly extended. Cover its face with a handkerchief or towel, draw a full breath and blow gently the first portion of the expired air into the mouth, one hand at the same time pressing over the epigastrium to prevent the air from passing into the stomach. Do not keep the nostrils closed, as sometimes recommended, but leave them open to act as safety valves. Too

much force in blowing air into the lungs injures the air cells. Catheterization of the trachea is dangerous because it, too, injures the air cells.

While carrying out these various procedures the nurse may be directed to bring two large basins or foot-baths—one containing hot and the other cold water. Put the child alternately into the two basins, taking care that the water is not too hot and do not leave it too long in the cold water. If the face is very livid it is well to cut the cord and let some blood escape before tying. Some advise hypodermic injections of whisky—10 to 20 drops—and strychnine $\frac{1}{100}$ gr. Their utility is doubtful, but a saline enema—2 to 4 ounces, at a temperature of 110°, sometimes has a good effect.

Washing the Babe.—The nurse should use warm water and bland "baby" soap and may use olive oil to assist in removing the vernix caseosa.

If the babe is premature and very weak it is better to anoint it with oil and wrap in cotton wool without dressing for days (see page 167).

Fig. 91.—Artificial Respiration. Byrd's Method. (First Part.)

Dressing the Babe.—The Gertrude baby suit is a reform method of clothing for infants, designed by Dr. Grosvenor, of Chicago, and introduced into Toronto by Miss Snively.

The Gertrude baby suit consists of three garments and diapers for the day, viz., dress, middle garment, undergarment, and diaper; a nightgown and diaper for the night.

The undergarment—i. e., the garment next the skin—is made of canton flannel or fine flannel or flannelette, cut in princess style, and reaching from the neck to ten inches below the feet, being

altogether 25 inches long; sleeves to the wrists; a tie and one button behind.

The middle garment is made of baby flannel, same pattern as the undergarment, but without sleeves, with neck and armholes scalloped, not bound, and with two buttons behind at the neck. It may be embroidered in any way desired.

Fig. 92.—Artificial Respiration. Byrd's Method. (Second Part.)

The dress or outer garment is made after the same pattern as the other garments, but about an inch longer. Any style of dress, however, may be used.

The diapers are of two sizes, 18 × 18 and 10 × 10 inches, the larger to be folded diagonally. The addition of the smaller where most needed saves unnecessary thickness over the hips and kidneys. Canton flannel is the material recommended. The nightgown is similar to the undergarment in pattern and made of baby flannel, but may be a little longer. All seams should be smooth and the hems at the neck, wrist, and bottom on the outside.

This method of dressing the baby commends itself because of its simplicity.

It does not interfere with the ordinary outside dress, which may be made in such styles as taste may dictate.

The advantages claimed are:

First.—All the clothing hangs from the shoulders.

Second.—There are no bands or bandages to interfere with the freedom of the thoracic, abdominal, and pelvic organs.

Third.—There is no pinning blanket or barrowcoat, and no shoulder blanket.

Fourth.—There is evenness of the covering of the body and no difference between that of the shoulders and other parts.

In dressing the infant the three garments are placed together—sleeve within sleeve—the baby, face downward, the combined garments are slipped over the head, the arms placed in the sleeves, and the garments fastened behind. At night the three combined garments are removed together and the flannel night-dress replaces them. No stockings or socks are worn night or day. There should be no fixed rules as to fabrics used. A fine all-wool stockinet of soft texture answers admirably for the undergarment.

The designer proposes to use no abdominal binder on the babe. I consider it almost a necessity, until the cord has become separated. I also prefer some sort of belly-band to be worn during the greater part of the time for one or two years. It affords great protection especially during the late summer and autumn months

Fig. 93.—Gertrude Baby Suit.

The undergarment in the center, the middle garment on the left, the outer garment on the right.

when young children are subject to bad forms of diarrhœa and dysentery. The tight band is, however, objectionable in some respects, because it "interferes with the freedom" of internal organs. My preference is to replace the band after the separation of the cord with a cylindrical knitted or woven band, which furnishes the protection without causing undue compression. The flannel skirts afford sufficient protection to the feet. The woolen socks commonly used can only be retained by the use of a band around the ankle, which may interfere with circulation in the feet.

ANÆSTHETICS IN LABOR

Importance of Chloroform.—Chloroform easily takes precedence over all other anæsthetics in labor. Sir James Y. Simpson proved, early in 1847, that sulphuric ether could be safely inhaled for the relief of pain in labor, and, later in the same year, that chloroform might be inhaled in a similar way and with similar results. For some years he strongly advised the use of this anæsthetic as a routine practise in the treatment of all cases of labor.

Fig. 94.—Sir James Y. Simpson.

This new treatment was stubbornly opposed, especially in Great Britain and the United States. The obstetricians of London were probably the most strenuous in their opposition for a short time. This perhaps should cause no special surprise, because we often find that the Edinburgh leaven leaveneth the London lump somewhat slowly. However, we are told that Her Majesty, Queen Victoria, had faith in Simpson and insisted upon her physicians adopting his methods in her subsequent confinements. This helped to popularize the administration of anæsthetics during labor even in conservative London. Chloroform was first administered to Queen Victoria by Snow in her seventh labor in April, 1853, when Prince Leopold was born. The medical attendants in charge were Locock, Grant, and Ferguson.

Chloroform properly administered is comparatively safe in labor. Clinical experience teaches that it is safer in obstetrical practise than in any other branch of medicine or surgery. And yet I do not wish to convey the impression that it is perfectly safe and may be administered to any extent in a case of labor. It some-

times stops the uterine contractions and thus prolongs the labor. It sometimes predisposes to post-partum hæmorrhage.

The administration of chloroform too early in labor, as, for instance, in the first stage, and in too large a quantity, is always dangerous. It fortunately happens that a death from chloroform during labor is almost unknown, excepting when the anæsthetic has been administered in an exceedingly careless and negligent way.

It is also an interesting fact that chloroform in labor almost never causes vomiting, whether administered to the obstetrical degree only or to the surgical degree.

Administration of Chloroform.—In considering the proper method of administering this anæsthetic it is well to observe certain rules.

1. Never administer it during the first stage. Some exceptions may arise, as, for instance, when there is extreme rigidity of the cervix due to spasm. In other words, in a normal labor never administer the chloroform until after the completion or about the time of the completion of the first stage. In an abnormal labor, however, there are exceptional conditions which require special treatment.

2. Administer the chloroform only during the pain, and only to what is called the obstetrical degree. By the obstetrical degree we mean that a patient is never completely anæsthetized—that is, she never becomes totally unconscious. The most common way of administering it now is by an Esmarch mask or something of that sort. This should be placed over the nose and mouth. The chloroform should be in a proper "dropper" bottle. This may be improvised by simply cutting a canal in the side of a cork (or two canals—one on either side) with a penknife, and then putting the cork in the bottle sufficiently tightly to let the chloroform come through drop by drop. It is better to put a little vaseline or cold cream over the nose and chin at the base of the mask to prevent burning from the chloroform.

At the commencement of a pain and during the pain pour on the mask three to eight drops of chloroform. As soon as the pain has ceased remove the mask from the face.

The patient, during such administration, is very apt to move her head, sometimes quite suddenly. Be careful, under such circumstances, not to pour the chloroform into the patient's eye instead of on the mask.

3. Administer the chloroform a little more freely toward the end of the second stage, especially while the head is passing the rima pudendi.

4. Administer no chloroform after the head is expelled.

Chloroform will require to be administered to the surgical degree in most obstetrical operations, whether performed during or after labor. It should be remembered, at the same time, that the relative safety of chloroform in parturition ceases with the birth of the child. It may be considered advisable, under certain conditions, to administer ether instead of chloroform, but of that more hereafter.

Forceps delivery is so common in uncomplicated labors that a brief reference may be made to the operation at the present time. During this operation the patient should be completely anæsthetized, or she should get no anæsthetic at all. If "under" only to the obstetrical degree the patient may plunge about to such an extent that the forceps, when partly or completely applied, become a source of danger.

After the administration of chloroform in the slighter degree for a certain time the contractions may become weaker and less frequent and progress may stop. Under such circumstances it is better to stop the administration of the anæsthetic for a time. This is not always easy to do, because the patient, after obtaining some relief from the anæsthetic, always clamors for more and certainly objects strongly to suffering any pain without getting a "few whiffs" at least. Under such circumstances, one may say that he is compelled to stop the chloroform because it is interfering with the progress of labor. The other alternative is to have the patient thoroughly anæsthetized and deliver with forceps.

It should be a positive rule when the patient is completely anæsthetized to get an expert anæsthetist, or at least a licensed practitioner, to administer the anæsthetic.

Ether.—It is generally understood that chloroform is more suitable for obstetrical purposes than ether, especially when one only wishes to anæsthetize the patient to the obstetrical degree. The ether is less pleasant (or more unpleasant) to inhale and is not apt to cause bronchial irritation. Most obstetricians will also agree that chloroform is preferable for forceps delivery. Many, however, prefer ether for protracted operations during labor or after labor, such, for instance, as cæsarean section, symphysiotomy, and

post-partum operations for lacerations of the perinæum and pelvic floor, if there be no bronchial or kidney disease.

Chloroform and Ether Combined.—During the last few years I frequently combine chloroform and ether, using 1 ounce of chloroform to 2 ounces of ether, or equal parts by bulk (as recommended to me by Stevenson). I carry in my satchel one 2 oz. bottle of plain chloroform and another 2 oz. bottle containing a mixture of chloroform and ether. I frequently administer the plain chloroform for a while and toward the end of the second stage put aside the plain chloroform and use the combined mixture.

Spinal anæsthesia by means of medullary cocainization, which was recommended two or three years ago, is now generally regarded as dangerous.

Chloral.—Although discovered by Liebig in 1832 chloral was not used in medicine until 1869. Early in 1870 Simpson commenced to administer it to women in labor and thought that it relieved pain without interfering with uterine contractions.

One of the most enthusiastic advocates of the use of chloral in normal labor was Playfair, who first recommended it something like thirty years ago. He considered it peculiarly adapted to the first stage of labor when the patient is suffering greatly and the os is rigid and dilating very slowly or not at all. He advised 15 grain doses of chloral every twenty minutes until three doses are given. The effect of this is that the patient becomes quite drowsy and dozes between the pains and wakens as each contraction begins. It may be necessary to give a fourth dose at a longer interval, say an hour after the third, but rarely more than a dram is required in the whole labor. About four or five years ago Playfair, at a medical meeting in London, reported his views as to the administration of chloral and stated that after more than twenty-five years of experience in its use he still thought as favorably of it as ever.

After using this remedy in the way described by Playfair for about twenty-five years, I can say that it answers admirably in a certain proportion of cases, and I have often wondered why it was not more generally used by the profession.

CHAPTER VIII

THE PUERPERAL STATE

GENERAL CONDITIONS

As before stated, it is often difficult to distinguish between the physiological and pathological in obstetrics. Especially is this the case in connection with puerperality, or the puerperal state. During the puerperium we find a variety of physiological conditions which might, under other circumstances, be considered pathological. This has been well pointed out by Schroeder and Lusk, the latter of whom uses the following words: "Thus the exfoliation of the decidua and the copious serous exudation with the abundant formation of young cells, which accompanies the development of the new mucous membrane, would elsewhere be regarded as characteristic features of catarrhal inflammation. The acute degeneration of the uterus presents a phenomenon which, when repeated in any other organ of the body, would prove speedily fatal. The thrombus formation in the open placental vessels possesses no corresponding physiological analogue. Again, the torn vessels may lead to hæmorrhage, while the traumata, which, even in normal labor, result from parturition, the ease with which deleterious materials are absorbed by the wide lymphatic interspaces, the serous infiltration of the pelvic tissues, the exaggerated size of the lymphatics and veins, create a predisposition to innumerable forms of disease. The nicety of the balance between normal and morbid conditions renders it peculiarly necessary for the practitioner to make himself familiar with the physiological limits of the phenomena of childbed."

And yet, if we do not interfere with Nature's methods, the wonderful changes included under the term involution take place as a matter of course after normal labors in the great majority of cases; and the healthy young woman becomes, at the termination of her puerperium, as vigorous and strong as she was previous to her

pregnancy. It is not strictly true that all the organs and tissues are restored to their original condition. The uterus, after pregnancy and labor, is never quite the same as the nulliparous uterus. The hymen and fourchette are almost invariably torn during labor and Nature does not restore them. However, the difference between the healthy uterus after labor and that before pregnancy is of no account practically, and tears of the hymen and fourchette do not as a rule produce serious consequences under aseptic or antiseptic methods.

It is generally considered that the puerperium lasts about six weeks. While this is not strictly true it is generally accepted as a

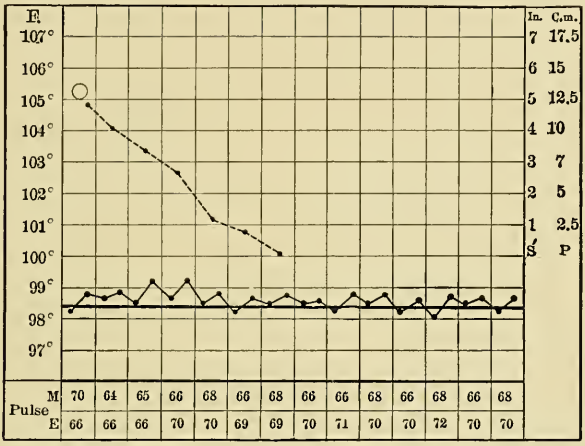


FIG. 95.—CHART SHOWING NORMAL INVOLUTION LINE, TEMPERATURE, AND PULSE-RATE.

Column on right shows scale in inches and centimeters. *S'. P.* is symphysis pubis.

fact by obstetricians. What is the full meaning of involution after six weeks? As expressed by Robb, it means that after six weeks the normal functions of the non-impregnated genitalia, namely, menstruation and conception, can begin again. While menstruation is rare in nursing women so early after labor, it is a fact that it is possible for them, from this time forward, to conceive again, the possibility becoming greater every month.

Involution of the Uterus.—This may be briefly defined as the process by which the uterus resumes its ordinary condition after labor. The rapidity of the diminution in the size of the uterus during the first two weeks after labor is remarkable. After the

expulsion of the placenta the uterus is strongly anteflexed, the fundus lying against the abdominal wall. The anteflexion increases somewhat during the first three weeks of the puerperium and is probably a part and an important part of Nature's provision for drainage of the lochia. After four weeks the uterus gradually returns to its normal shape. The superficial layer of the mucosa

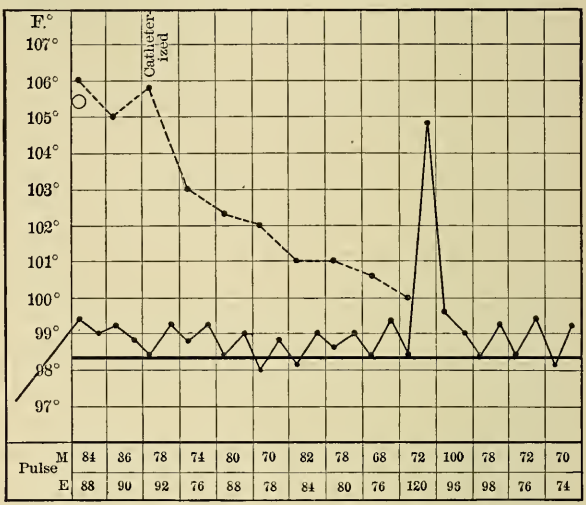


Fig. 96.—Chart showing Abnormal Involution Line. Rise of temperature from emotional cause.

(the cellular layer), which is in contact with the decidua, is generally thrown off with the membranes, forming a part of what we call the chorion. The deeper layer (the glandular layer) remains behind, and from it is developed the new endometrium in about four to six weeks.

The Involution Line. Daily measurements of the distance of the fundus uteri above the symphysis pubis should be taken. By marking the position of the fundus from day to day we obtain what is called in Queen Charlotte's Hospital the involution line. We have had this line traced on all our charts at the Burnside during the last three years. The fundus descends more rapidly in the primipara than in the multipara, the difference being on an average one or two days in favor of the former. It reaches the top of the symphysis before or on the eighth day in 70 per cent. of primiparæ, and only about 40 per cent. of multiparæ. It reaches the symphysis

before or on the tenth day in the majority of multipara. In both primiparæ and multiparæ the time may vary from five to twelve days without any apparent abnormality. We attach much importance to the involution line in the Burnside and also in private practise.

The involution of the vagina, the process by which the vagina resumes its ordinary condition of after labor, is probably slower than that of the uterus and is complete in about eight weeks.

Chill or Rigor.—The patient is very apt to have a rigor or chill toward the end of labor or after the completion of labor. It generally lasts from a few minutes to a quarter of an hour and is not accompanied by any change in the pulse or temperature. When a patient is seized with a chill the nurse should put on a little

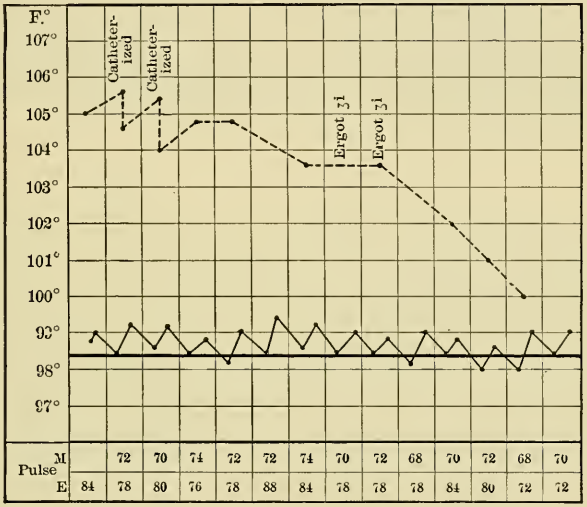


Fig. 97.—Abnormal Involution Line.

Slight subinvolution caused at first apparently by distended bladder. The administration of ergot appeared to assist involution.

extra covering and the doctor should encourage her by telling her that it means nothing serious, but is quite a common occurrence after labor.

After-pains are so common that they may generally be considered as physiological. They are not so apt to occur after first labors and frequently grow steadily worse after succeeding labors. As they are due to contractions of the uterus, which tend to empty

that organ and also to bring about involution, they are really beneficial. On this account we should avoid interference for a time. After three or four hours, however, it is well to give some simple opiate if the pains are severe.

Pulse.—The pulse usually increases in frequency during labor, reaching 90 or 100, but shortly after delivery it becomes less

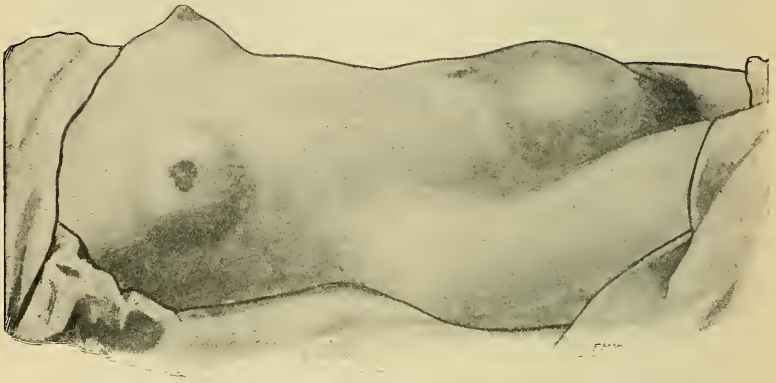


Fig. 98.—Bladder after Labor, Empty, Uterus in Normal Position.

rapid, sinking frequently, if not generally, below the normal in from eight to twenty-four hours. It frequently falls to 50 and sometimes to 40. This slowing of the pulse is a favorable indication and generally lasts about five or six days.

Temperature.—There is generally some increase of temperature during labor, which may continue for about twelve hours after. McIlwraith believes that a rise of temperature during labor ought not to be considered physiological, but pathological, inasmuch as it indicates that the patient is growing weak, and probably requires artificial assistance. Generally, however, the temperature declines again within twenty-four hours and remains stationary during seven or eight days with only the usual morning and evening variations. There are no special changes in respiration.

Modifications of Secretions.—The secretions, especially from the skin and kidneys, are greatly increased for a time after labor. Soon after delivery the body is generally covered with perspiration, especially during sleep. This hypersecretion continues for about a week. The quantity of urine is also greatly increased. This frequently helps to cause a condition which may be considered

to a certain extent pathological, or, at least, abnormal; that is, retention of urine. This retention may exist with a certain amount of overflow. An inexperienced practitioner does not always appreciate the fact that the bladder may become enormously distended within a very short time after labor, especially if it has not been thoroughly emptied during labor. It is well to have in one's mind the fact that an abdominal enlargement appearing after labor is generally due to a distended bladder. A friend of mine has frequently told me that he felt extremely mortified on one occasion something like thirty years ago, when he called in Dr. W. T. Aikins to make a diagnosis of an abdominal enlargement about twenty-four hours after the termination of labor. The enlargement in that case was found to be due to retention of urine. This condition is discussed in another part of this chapter under "Micturition."

The Condition of the Digestive Organs.—One can easily understand that, on account of the great increase of the secretions of perspiration and urine, considerable thirst is apt to occur during such

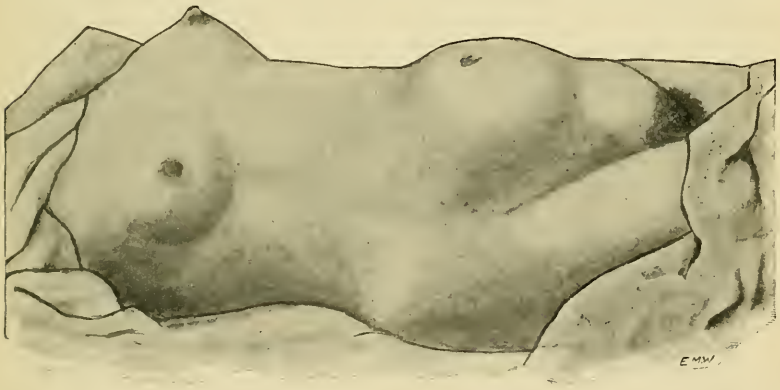


Fig. 99.—Bladder after Labor, Distended, Uterus pushed upward.

hypersecretion. The appetite for the first two or three days is generally lessened and the bowels are apt to be slightly constipated.

Lochia.—On account of some doubt as to the derivation of the term *lochia*, the word may be used either in the singular or in the plural, although I think it is more commonly considered a plural word. The lochial discharge is composed of red blood cells, portions of clots, and shreds of decidua at first, and is called *lochia*

rubra. It gradually becomes pale in color and in about a week after labor, contains colored serum, epithelial and cylindrical cells, leucocytes, albumin, chlorides, etc., and is called *lochia serosa*. Finally it becomes muco-purulent and is then called *lochia alba*. The character of the lochia varies greatly in different women. After becoming colorless, or nearly so, it frequently becomes red again without any apparent cause. The discharge generally lasts from two to five weeks.

The lochia within the uterus should always be sterile. Generally the discharge is sterile even in the vagina for a day or two, but after two or three days numerous microbes are found in it, such as streptococci, staphylococci, and colon bacilli. These probably originate mostly from those existing in an inert condition in the vagina before delivery, while some probably enter from without.

Changes in the Cervix Uteri.—Immediately after birth the cervix is lying relaxed and soft and the os more or less torn. The internal os is not well marked and the lower uterine segment and the cervix appear like a long tube with thin walls. The contraction ring very quickly approaches the internal os and the two become blended in a week, or perhaps less. The internal cervical ring remains relaxed and soft so that one or two fingers may be passed through it up to about the end of the second week. It is possible, therefore, to explore the uterus with the fingers during the first two weeks after labor.

The Breasts.—A fluid called colostrum is found in the breast during the latter part of pregnancy and immediately after labor. This colostrum is not really a secretion from the gland cells, but rather a transudation from the blood. It differs in many respects from milk. It is yellowish-white in color, richer in fat and sugar than milk, and contains albumin instead of caseinogen. Microscopically it contains fat globules, pavement epithelium, occasional milk corpuscles, and large round glandular cells.

The Establishment of the Secretion of Milk.—The breasts soon become congested and at the same time hard and tense. The swollen condition thus produced causes some discomfort or pain. There is sometimes slight general disturbance of the system, which, in the old days, was called milk fever. The secretion of milk generally commences on the second or third day after labor and is fully established by the third or fourth day, generally the third in multiparæ and the fourth day in primiparæ.

The mother's milk is not pure, as formerly supposed, but generally contains many staphylococci and sometimes a few streptococci. It is supposed that these microbes have found their way into the breast through the channel of the nipples, but it is understood that they do not, under ordinary circumstances, injure either the mother or child.

THE CARE OF THE MOTHER

The Visits of the Physician.—The physician should remain in the house one hour at least after the expulsion of the placenta. He should make arrangements to have the patient kept as comfortable as possible and should leave some rules respecting the treatment of the after-pains. He should also leave instructions to keep the patient as quiet as possible for a number of hours.

He should make his first visit within twelve hours after labor. He should at this time get full information as to temperature, pulse, respiration, time occupied in sleep, character of the discharges, presence of pain or aches, and particularly as to the passage of urine. It is very important to get full information as to every symptom, no matter how slight it may seem. If the patient has had a comfortable time—if, for instance, she has slept a good portion of the night, has no headache or any other unpleasant symptom—one has great reason to feel encouraged. If she says that she feels very well excepting that she has a slight headache and did not sleep very well, there is reason to fear that something is wrong. *The first visit after labor should never be a hurried one.*

While asking certain questions the physician should watch the patient carefully without appearing to do so. He should note the expression of her face, the condition of her eyes, forehead, lips, etc., the character of her respirations, the position in which she is lying, the position of the legs, arms, etc.

After the first day the physician should see his patient at least once a day for a week or ten days, then every second or third day until the end of the third or fourth week. Such directions apply especially to attendance on patients in cities or towns. It happens in many country districts, that the physician in certain cases makes no subsequent visits after attending his patient in confinement. I do not think, however, that any physician should take

the responsibility of conducting a case of labor without seeing his patient at least once or twice after the birth of the child.

The Duties of the Nurse.—The nurse should be scrupulously clean in her methods and should be careful to keep the patient and everything around her as clean as possible. The vulvar pads should be changed frequently and the parts washed with a warm aseptic or antiseptic solution, as mentioned in connection with the management of labor. The antiseptic solutions are preferred, not so much on account of any inherent virtue existing in them, but chiefly because their systematic use for external washings is apt to make the nurse more thorough in her methods. The first vulvar pad should be removed in less than an hour after its application. After the second pad is applied the nurse should generally expect the patient to have some rest. With that object in view she should disturb the mother as little as possible. A sleep of an hour or two at this time is worth much. When she wakens the nurse should then again change the pad.

There was at one time a belief that combing or brushing the hair was apt to induce post-partum hæmorrhage during the first week of the puerperium. There is, of course, no reason for such belief excepting in so far as the dressing of the hair might cause fatigue. The nurse in the Burnside, in preparing the patient for labor, always thoroughly combs and braids her hair after she has had her bath. When this has been done it is quite a simple matter to look after the dressing of the hair. The nurse should wash the hands and face at least twice daily and should also sponge the whole body with tepid water once a day. It is well also, especially in warm weather, to dust with baby powder such regions as the groins and axillæ.

The nurse should loosen the bandage once every day and search for the fundus uteri so that she may properly mark the involution line. The bandage should then be reapplied as carefully as it was immediately after labor.

Post-Partum Vaginal Douching.—Routine vaginal douching during the puerperium was very commonly carried out some years ago. I have for a long time opposed the practise for the following reasons:

1. Douching disturbs that perfect rest and quiet which are so desirable for a patient after labor. No reference is here made to surgical rest of wounded tissues, but to rest in a general way, which

is so delicious to a weary and more or less exhausted woman. I have often thought and sometimes stated that meddlesome midwifery reached the acme of absurdity when, in 1883, T. Gaillard Thomas, one of the most distinguished gynæcologists in the world, recommended one of the most extraordinary methods of aggressive obstetrical meddling that had ever been conceived by the brain of man. He advised, among other things, the administration of a douche every eight hours and the introduction of an iodoform suppository every two or three hours for at least ten days after delivery; that is to say—the bruised and lacerated vagina was invaded from eleven to fifteen times every twenty-four hours for at least ten days, if the unfortunate victim should live so long. Little wonder was it that Fordyce Barker entered a vigorous protest.

2. Douching is unscientific on surgical grounds. After labor the utero-vaginal canal is bruised and wounded. On surgical principles the most important points in the treatment are rest, pressure, position, and drainage. By rest, I refer to that physiological rest to which so much importance has been attached by Hilton and many others. The wounds of the cervix and vagina are, as a rule, kept closed by the elastic and even pressure of the surrounding tissues. The introduction of suppositories and douching seriously interfere with the rest and pressure as described, and, in my opinion, materially delay healing of these wounds. The recumbent posture with the slight changes in position required in voiding urine and fæces is well adapted for drainage.

3. Douching is actually dangerous. It is apt to disturb clots and thus open avenues for infection, to open lacerations of the cervix and vagina and thus prevent them from healing, to wash bacteria into the uterine cavity and thus cause septic endometritis. Among other dangers which are generally due to accident or carelessness are the introduction of septic matter by fingers and instruments.

In a certain minority of cases the douching becomes advisable, as explained in the chapter on Septicæmia.

Care of Breasts.—Thirty years ago obstetricians were taught to be careful about massage of the breasts, but they thought a certain amount of massage and pumping was necessary in some cases. In 1882 Garrigues commenced the systematic use of his breast bandage, which made the rubbing and pumping unnecessary as a rule.

Unfortunately, a serious massage epidemic seems to be spreading again over the North American continent. The rubbing and squeezing evil is back again among us. I think that four artistic plates, which are found in a certain Textbook of Obstetrics, together with an elaborate description of the technique of breast

Fig. 100.—On left, piece of factory cotton 36 × 16 in. folded twice with lines indicating portions to be cut out. In center, piece of cotton with portions cut out On right, piece of cotton unfolded showing the bandage ready for application.

massage, is, to a large extent, responsible for the present popularity of this dangerous procedure. According to Bacon, of Chicago, the directions seem to have become common property and are copied from one textbook to another in the United States.

The following are the main objects of the breast-binder:

1. To support the swollen and tender breasts when congested and distended with milk.

2. To prevent pain by evenly applied pressure, which prevents, to some extent, the congestion and distention.

3. To "dry up" the breasts when the child is still-born, or when the patient, through disease or other cause, is prevented from nursing her babe.

4. To prevent mastitis.

I have used for the last fifteen years a breast-binder devised for me by Miss Snively, of Toronto. It is similar in shape to that of Miss Murphy or Dr. Garrigues, of New York.

With a piece of cotton and a pair of scissors one can quickly cut out an excellent bandage. The following directions furnished by Miss Snively, explain very clearly how it is made.

Material, 16 to 18 inches of strong factory or bleached cotton, one yard wide.

1. Fold the selvage edges together, then fold in the same direction again. The cloth is now four thicknesses and must remain so until all cutting is finished.

2. The first cut will be on the side opposite the selvage edges. Place scissors 2 inches from the edge and cut downward 8 inches, taking a circular direction outward after cutting 7 inches. This forms the armhole.

The straight edge, 36 inches long, is now the bottom and the opposite side the top.

3. Now fold the four thicknesses over about 4 inches. This will bring the selvage edge even with the first 7 inches of the

Fig. 101.—Snively Breast-Binder applied.

opening first made for the arm. Press this firmly with the hand so as to leave the mark of the fold, then unfold.

4. Place the scissors three inches from the top on the selvage side and cut in a circular direction toward the top of the mark of the fold; this forms the neck.

5. In applying binder the shoulder pieces can be joined with small safety-pins, while the front is joined with ordinary pins or larger safety-pins. The front is turned in to fit the patient, no sewing being required.

Sometimes the bust measures more than 36 inches; in such

cases take a piece of cotton and cut it lengthwise, making it 38 or 40 inches long and 16 to 18 inches wide. Then cut as directed in rules 1, 2, and 3.

In private practise I use the Snively bandage in all cases where the breasts become in the slightest degree uncomfortable from distention. It affords a wondrous degree of comfort in a large proportion of cases, especially in "drying up" the breasts. No application of atropine or belladonna is required when the bandage is used.

The bandage has one drawback which should ever be kept in view in the nursing woman. It diminishes the secretion of milk when tightly applied. In consequence of this we do not use it in

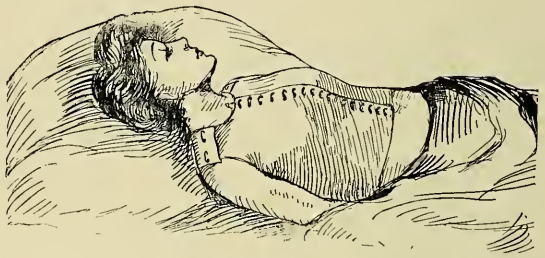


Fig. 102.—Murphy Binder, "Ready-made."

all cases as Garrigues and others do in New York, but only when the breasts become tender. We only make it sufficiently tight to relieve pain and remove it as soon as we can.

Further reference is made to this bandage in speaking of the prevention and treatment of mastitis.

Nipples.—In speaking of the hygiene of pregnancy, it was stated that it is dangerous to handle the nipples to any great extent. The condition of the nipples, however, should be ascertained soon after labor, if not known before. It is sometimes advisable, especially in primiparæ, to make certain attempts to increase the prominence of the nipples before the secretion of milk. A common way of doing this is to have the patient herself or the nurse pull the nipples forward with the fingers in imitation of the action of the babe's mouth. Sometimes they may be drawn out by gentle suction of a breast pump. A very simple and common method of suction is by means of a hot bottle. Take a six or eight ounce bottle and fill it with hot water, pour out the hot water rapidly and apply the

bottle quickly over the nipple. The condensation of the air which occurs during the cooling of the bottle creates a partial vacuum and thus a certain amount of suction upon the nipple, which is drawn into the neck of the bottle. Any or all of these procedures may, however, seriously irritate and injure the nipples.

Food.—The patient is not generally hungry during labor, nor for two or three days after, as before mentioned. It is not necessary to make any hard and fast rule as to diet, but to be largely guided by the appetite of the patient. On the first day a very simple and plain diet seems most suitable; for instance, hot drinks, such as tea, milk, gruel and some simple solids, such as bread and butter, bread or rice puddings, and the like. On the second day the patient may take any sort of plain substantial food that she chooses—that is, she may be placed on what we call mixed diet. It is well, however, to watch the effects of vegetables, fruits, and sweets until the patient has left her bed and is having a certain amount of exercise.

Micturition.—As before mentioned, there is likely to be an unusually large secretion of urine for some days after labor. For certain reasons, already alluded to, retention of urine is not unusual. The nurse should look after the patient in this respect and encourage her to void urine before the bladder becomes distended. It is frequently difficult for the patient to do this while lying on her back. If not too much exhausted after the labor it is well sometimes to raise her nearly, if not quite, to the sitting position or allow her to turn on her hands and knees. Catheterization should be avoided if possible. It exposes the patient to the risk of septic infection of the bladder, which is a very serious condition. Again, when catheterization has been once performed it must generally be continued for many days. One should remember, however, that retention of urine, even when there is some intermittent or continuous flow, not infrequently causes enlarged bladder and displacement of the uterus. In such a case catheterization is necessary. Since we adopted the involution line we have discovered that partial retention of urine is more common than we formerly supposed, and is the cause of pain in the region of the uterus, which may last for days and is frequently misunderstood.

One of the most common expedients for encouraging the flow of urine is to place a hot compress, such as a hot sponge, over the suprapubic region. Miss McKellar, in the Burnside, has frequently

found a good result from the administration of an enema. The enema of soap suds is retained for some time, the patient put in a partial or completely sitting position, and the urine is voided while the soap suds or fæcal matter is coming away from the bowel.

Bowels.—It was formerly understood that the bowels should be moved on the third day. I think that only one day should intervene before the bowels have been moved. For instance, when a patient in labor one day passes the following day without a motion of the bowels an aperient should be given that same evening. It is well to ascertain what cathartic the patient is in the habit of taking. Any of the simple cathartics, such as rhubarb pills, cascara, compound licorice powder, phosphate of soda, sulphate of soda, etc., will answer very well. After taking the cathartic in the evening an enema may be administered the following day before noon, if necessary.

The patient should be kept in bed nine to fourteen days after labor.

She may be allowed to walk in three weeks.

She should be well in four weeks, but should not do much work for six weeks.

THE CONDITION AND CARE OF THE BABE

The following are a few of the practical points in connection with the anatomy and physiology of the babe:

Breathing.—The breathing is superficial, and rapid up to 50 a minute; the pulse can not be counted at the wrist immediately after birth, but can be over the heart. The rate is 130 to 140 during the first two months, 120 to 130 from the third to the sixth month, 115 to 120 from the seventh to the twentieth month.

Evacuations from the Bowels.—Some meconium may be expelled during the birth of the child and more is expelled shortly after birth. It is a dark, green, tarry substance. This is followed by brown fæcal matter, which becomes lighter in color until the end of the first week, when it has a light yellow color.

Urine.—There is very little urine in the bladder at birth and very little is secreted during the first twenty-four to thirty-six hours. When urination takes place very soon after birth the fluid is light in color, but when delayed for twenty-four to thirty-six hours it is apt to have a deep yellow color and to be turbid. Some-

times it contains considerable uric acid and urates causing yellowish or red deposits on the napkin, which are sometimes mistaken for blood. No alarm need be caused if the urine is not voided inside of thirty hours. If no urine is passed within thirty-six to forty hours it is better to pass a small catheter or a silver probe; but this is very rarely necessary.

Bladder.—The bladder, when distended, is egg-shaped and lies chiefly in the abdomen. The muscular wall is relatively thick, causing the bladder in female infants sometimes to be mistaken for the uterus on post-mortem examination. The urethra is situated along the anterior wall of the vagina and its meatus appears almost as large as the orifice of the vagina. This causes a little confusion sometimes in passing a catheter.

Growth.—The average weight at birth is 7 pounds (3,200 gm.), the average length, 20 inches (50 cm.). The babe loses weight for two or three days after birth, but after the fourth or fifth day it should commence to grow and such growth should continue steadily.

The Cord.—After the first dressing the cord requires no special care. If the dressing is disturbed by the daily bath it may be replaced in a clean way. The cord generally separates in from four to eight days, a small superficial ulcer being left. This should be kept clean and dry and dusted with boric acid.

The diapers should be changed frequently. When soiled the buttocks and genitals should be washed with lukewarm water, but after washing the parts should not be wiped with an ordinary towel. Soft linen, cotton or muslin should be gently pressed against the skin so as to soak up the moisture, the parts should then be dusted with some fine powder, such as talcum.

The Stomach.—The stomach of a new-born babe is very small, being little more than a simple dilatation of the intestinal tube, and will hold, without distention, little more than an ounce of fluid. When more than an ounce is taken vomiting is apt to occur from simple contraction of the stomach walls. This occurs very frequently and should cause no alarm, as it is not ordinary vomiting but a simple regurgitation without nausea.

Feeding.—During the first three days before the secretion of milk in the mother's breast the babe requires very little or no food. A little plain warm water slightly sweetened may be given to it occasionally during these early days. Generally speaking, during

the first month the child takes about 20 ounces daily, during the second about 24 ounces, during the third about 28 ounces, from the fourth to the ninth month 30 to 35 ounces.

It is generally recognized that in the interests of the child the mother, providing there be no contraindication, should always nurse her babe. In some respects this is also in the interests of the mother, because involution of the pelvic structures takes place more slowly when the mother does not nurse her babe.

Contraindications to Maternal Nursing.—It is not easy to lay down definite rules as to such contraindications. On the one hand the healthy woman should always nurse her babe, unless her nipples are extremely deformed; on the other hand, a woman suffering from advanced tuberculosis, severe puerperal septicæmia, or any disease which greatly enfeebles the system, should not attempt to nurse her child. Generally speaking it would be neither in the interests of her child nor herself.

In cases of doubt, however, it is well for the mother to make the effort to nurse her babe in part at least. Frequently she may be able to nurse the babe wholly or partly for three or four months, but if it becomes evident at any time that such efforts are injuring the mother, and perhaps the babe as well, the suckling must be stopped entirely.

The mother may not have sufficient milk for her child even at any one time of nursing. When in doubt on this point it is always well to offer the babe a little sweetened warm water after suckling. Always take care that the babe has sufficient liquid. Never let a day pass without the mother or nurse offering the child three or more times in the day a certain amount of sweetened water.

Wet Nurse.—Next to the mother, probably all will agree that a suitable wet nurse is best for the child. It is a very simple thing thus to state what may be considered an actual truism, but, unfortunately, it is an exceedingly difficult thing to get a *suitable* wet nurse. A wet nurse should be perfectly healthy in all respects, but, especially, free from tuberculosis or syphilis. Her mammary glands should be well developed and the nipples should be well formed. The milk should contain not less than 10 per cent. of cream. It is better, if possible, to have a married woman. In the majority of instances a wet nurse is more or less unsatisfactory, and frequently intolerably so. Artificial feeding is, of course, not satisfactory, but on an average it is probably better than wet nursing.

ARTIFICIAL FEEDING

Milk.—All things considered, cow's milk, when properly modified, makes the best food we can get for infants. It contains, however, more caseinogen and less sugar than woman's milk. It should, therefore, be diluted so as to diminish the proportion of casein and should be sweetened with cane sugar or sugar of milk. Some think that it should be completely or partially sterilized.

Sterilization. To sterilize milk thoroughly so as to destroy the bacteria and spores of bacteria it is necessary to boil the milk not less than thirty minutes. This decomposes the sugar, melts the fat, and toughens the casein in a way that renders it much less digestible than the unsterilized milk.

Pasteurization. This means a partial sterilization of the milk at a temperature not exceeding 158° F. for fifteen minutes. This is said to destroy the typhoid, diphtheria, and tubercle bacilli and also a large proportion of bacteria. The process probably injures the digestibility somewhat, but not nearly so much as the complete sterilization.

The following are simple rules as to the methods of modifying cow's milk for infants.

During the first month mix the cow's milk with twice the quantity of plain water and add one-half teaspoonful of milk sugar for each feeding. During the second month mix the milk and water in equal parts and add milk sugar as before. During the third and fourth months mix two-thirds to three-fourths of milk with one-third to one-fourth of water. During fifth and sixth months give the milk undiluted. Some prefer to dilute the milk by mixing it with barley water instead of plain water. It is probably not well, however, to use the barley water before the third month on account of the starch which it contains.

Cream Mixtures.—The cream mixtures, of which there are many varieties, are probably the best for infant feeding. Skim the cream from milk after it has been standing six or eight hours, or, say, overnight. Some prefer to leave the milk standing in a jar for some hours and then siphon off the lower half, two-thirds, or three-quarters of the milk thus leaving the portion which contains the cream. One can not lay down any fixed rules as to the proportion

of a cream mixture which will suit all infants, but the following table, by Louis Starr, may be taken as an excellent guide:

Table of Ingredients, Hours and Intervals of Feeding, and Total Quantity of Food for a Healthy Artificially-fed Infant from Birth to the End of the Seventh Month.

Age.	Cream.	Whey.	Milk.	Milk-Sugar.	Salt	Water.	Hours for Feeding.	Intervals of Feeding.	Total Quantity.
During 1st week....	f ʒ ij	f ʒ iij		gr.xx		f ʒ iij	5 A.M. to 11 P.M.	2 hours	f ℥ xij
From 2d to 6th week.	f ʒ ij		f ℥ ss	gr.xx	a pinch	f ℥ j	5 A.M. to 11 P.M.	2 hours	f ℥ xvij
From 6th week to end of 2d month...	f ℥ ss		f ʒ x	ʒ ss	a pinch	f ʒ x	5 A.M. to 11 P.M.	2 hours	f ℥ xxx
From 3d to 6th month	f ℥ ss		f ℥ ij	ʒ j	a pinch	f ℥ jss	5 A.M. to 10.30 P.M.	2½ hours.	f ℥ xxxij
During 6th and 7th months..	f ℥ ss		f ℥ iijss	ʒ j	a pinch	f ℥ ij	7 A.M. to 10 P.M.	3 hours	f ℥ xxxvj

It is more convenient to vary the ingredients of the cream mixture according to the age of the child. Some prefer, however, to determine the composition and amount of food according to the weight instead of the age. It is perhaps better to consider both the weight and age. For instance, one babe at six months may not be larger than another at three months. In such a case it is better to give the food suitable for the earlier age. It is generally better in all cases to dilute the food rather than change it when the child is not thriving. The mothers can not always understand the philosophy of such treatment, but it is better to teach them if possible.

One of the most important columns of the Starr table is that which gives the intervals of feeding. The infant should be fed with absolute regularity whether it gets mother's milk or artificial food. The young babe should have one long sleep of six hours during the night, and should be wakened at the proper hours during the day—i. e., every two hours if necessary. Many mothers and nurses dislike to disturb peaceful sleep, but there is no harm in doing so.

The babe will take its meal after being thus disturbed and go back to the "peaceful sleep" in good time, often immediately. It should sleep eighteen to twenty hours out of twenty-four, but if allowed to sleep four or five hours at one time during the day it is more apt to become wakeful at night. Good or bad training in such regard will produce in young infants good or bad habits in a very short time.

It is better in some cases to use the whey for a longer time than one week as recommended by Starr. Whey and cream form an admirable mixture.

Vigier's method of preparing cream and whey mixture:

Divide one quart of milk into equal portions, let both stand three or four hours in a cool place. Then skim the cream from one portion and add it to the other. Add one teaspoonful of liquid rennet to the skimmed portion and warm to 95° to 104° F. with frequent stirring for twenty minutes, or until it forms a tough curd. Then heat to a temperature of 155°, after which strain through muslin and cool. For infants under five months mix equal volumes of this whey with the enriched milk. I prefer for infants under two months mixing two-thirds of whey with one-third of rich milk. With infants over six months mix two parts of rich milk with one of whey.

Monti prefers a mixture of whey with ordinary milk in equal volumes for the first three months, and after that two parts of milk with one of whey. When a child appears to be suffering from indigestion, as shown by the presence of undigested casein in the stools, it is well to feed the babe for one, two, or three days on whey alone. Even when depending on whey alone or any mixture of whey with cream or milk, it is still desirable to offer the babe frequently plain water or plain sweetened water to drink.

One should be very careful to see that the bottles and nipples are properly cared for. Each bottle should, if possible, be only sufficiently large to contain about one meal for the babe. The nipples should be made of plain black rubber, with three holes of size not to allow too much nor too little milk to pass. When too much passes it chokes the child, and when too little can be drawn through the child grows tired of sucking.

While the infant is being fed it should lie on its back with the head a little raised. The bottle should be held or placed so that the bottom points upward, with the nipple placed against the

tongue. Garrigues points out that if these rules are observed the child is not apt to get its stomach filled with air.

Condensed Milk.—Condensed milk is used by many for infants up to the ages of nine to twelve months. The canned milk, which contains a large amount of sugar, is more commonly used. This milk, in addition to containing too much sugar, has also some of the disadvantages of sterile milk, and should not be used for any length of time. I believe, however, that it does very well for a limited time, up to three months, if not more. Such being the case, it may be used by people who are not in a position to devote the time to the proper preparation of other food, such as cream mixtures. It is often more convenient and safer for young children when traveling.

Manufactured Artificial Foods.—Some of the artificial foods now found in the market are very good. I think it better to choose those which may be mixed with warm water. Such foods are also convenient and safe for children when traveling.

When the mother is able to nurse her child she should do so for nine months. The period of lactation may perhaps be prolonged to twelve months, or it may require to be curtailed. Very frequently it happens that the child may get its nourishment partially from the breast and require supplementary feeding with artificial foods.

CARE OF PREMATURE INFANTS

We can not say exactly at what period of time in pregnancy a child becomes viable. It is generally supposed that the child is viable at the end of the seventh month of gestation. This is recognized by law in certain countries. It is probably a fact that a child may be viable at the end of the sixth month. From a medical standpoint it is probably better to consider any child viable when it breathes at birth.

It is well at the same time to have a clear idea of the general appearance of a seventh-month fœtus. A singular case occurred a few years ago, in which Dr. Temple and myself were called to report as to the probable viability of an infant.

A premature infant expelled at 2 A. M. Supposed, from the history, to be five months advanced. Poor light, poor surroundings, in a small house. Fœtus, when examined with the dim light of the candle, showed no sign of life and was left on the bed for

some time while the mother was cared for. Fœtus again examined carefully, covered with cotton-batting and placed in a rough box, which was covered, and carried, between 9 and 10 A. M., to what would correspond to a vault in a large cemetery, the intention being to bury it in an hour or so. Some one passing thought he heard a cry. The box was opened and the infant was found to be living. It was exceedingly feeble, however, and died in a few hours.

In our report we expressed the opinion that the child was born in the seventh month of pregnancy and perhaps early in that month. While the child was born alive, we doubted whether it could be considered viable in the proper sense of the word—that is, we doubted whether it was born with sufficient vigor to enable it under the best of circumstances to live to manhood or even to boyhood.

Two things are of great importance in the care of a premature infant:

1. The maintenance of the body temperature.
2. The proper administration of nourishment.

The Maintenance of the Temperature of the Body.—Heat is the all-important thing for the premature babe. Artificial respiration, which is so important in certain cases for the full-term babe, is not of much use for the premature infant. The old-fashioned way of treating the premature babe was to wrap it up warmly and put it behind the kitchen stove. Such procedure seems sometimes to be quite as effective as the use of the most modern and expensive incubator.

Incubator. An incubator is something that one can very easily manufacture in any house, even in the backwoods. A large market-basket, a small clothes-basket, or a candle-box is used. One-half the basket or box is filled with cotton-wool or something of that sort. The child is anointed thoroughly with warm sweet-oil or cod-liver oil (which I prefer), and placed undressed in the basket or wooden box on the cotton-wool, having, however, an absorbent pad under the buttocks for the collection of fæces and urine. Cotton-wool is then added to the sides and over the front of the child, leaving only the face and part of the head uncovered. Two hot-water bottles are placed on either side and one below the feet. The hot-water bottles are so arranged that they can be filled without disturbing the child. The temperature in the box is kept at or about 85° to 95° F. and the temperature in the room from 72° to 75°, or perhaps even up to 80°, for the first half day. The box

may be covered by a quilt or shawl, leaving the face still uncovered.

The only difficulty that one need experience in a house in the backwoods will perhaps be the want of a thermometer. In such a case put in the bottles water as hot as the hand may be immersed in without discomfort, change occasionally, and leave the box in a portion of some warm room where you are satisfied the temperature is not below 70°.

If something more pretentious in the way of an incubator is required the Tarnier or Credé or Auvard or "Ideal" incubator may be chosen.

The Proper Administration of Nourishment.—The premature infant, like any other infant, should receive definite amounts of nourishment at regular intervals, the quantity and frequency of administration depending upon its age, vigor, etc. The mother's milk, of course, is the best food. The milk from a healthy wet-nurse will answer if milk from the mother is not available. If artificial feeding becomes necessary some of the foods which have been recommended should be used, a mixture of very little cream with whey and a little lime-water being one of the best. During the first day probably plain warm water, a quarter to one-half teaspoonful every hour or two, will be sufficient, or occasionally the same quantity of milk from the mother's breast, or artificial food. It is generally better to give it to the babe with a teaspoon, or a few drops may be introduced into the back part of the mouth or the pharnyx through an ordinary medicine dropper or small syringe.

Gavage.—Another method of administering food is known as gavage. The infant lies with the head slightly raised, a 14 or 16 (French) soft rubber urethral catheter, thoroughly sterilized, is first anointed with a little of the food to be given. It is then introduced into the pharynx and gently passed on to the stomach as the child swallows. A little artificial food is passed through the catheter from a small glass funnel or syringe inserted into the outer extremity of the tube.

CHAPTER IX

FACE PRESENTATIONS, BREECH PRESENTATIONS, MULTIPLE PREGNANCIES

FACE PRESENTATION

This condition is found in 1 out of 250 cases and is probably produced by extension of the occiput in vertex presentations. It is thought by some that such extension is occasionally found before labor, but in the great majority of cases it is developed after the onset of labor. The causes are briefly these:

Obliquity of the uterus, through which the head, instead of being driven downward into the pelvis is forced against the side of the brim. In this way the descent of the occiput is arrested and the descent of the chin is favored. *Dolichocephalic head*—that is, with occiput projecting, causing lengthening of the posterior arm of the cephalic lever (doubted by some). *Round and small head*, causing equality of the two arms of the cephalic lever. *Flat pelvis*, preventing the broad occipital portion from engaging in contracted conjugate diameter and causing it to be pushed to the side of the pelvis. *Congenital swellings* of the neck—tumors of the thyroid or thymus glands. *Small fœtus*. *Anencephalic fœtus*. *Hydramnios*, especially with sudden escape of liquor amnii. *Coiling of cord* round the neck. *Occipito-posterior* positions in which there is a "tight fit" at the brim (Cameron and Webster).

Among these causes the most common are obliquity of the uterus, especially when the back of the child is toward the mother's right side, flat pelvis, and hydramnios. It is especially important to keep these causes in view, because they can generally be discovered during pregnancy.

Diagnosis.—*Abdominal palpation.* Sometimes diagnosis by palpation alone is exceedingly difficult or impossible; sometimes the projecting occiput can be readily detected above the pubes and at one side, while the breech is felt at the fundus on the same side (Pinard). The heart sounds can generally be heard on the opposite

side because in face presentation the chest of the fœtus usually presses directly against the uterine wall, while the back does not. We therefore hear the heart sounds from the front of the chest instead of from the back. The furrow between the back and occiput may sometimes be felt, and there is a lack of adaptation of the fœtus to the uterus and abdomen.

Digital Examination. As the presenting part is high up early in labor it is difficult to make out much by a vaginal examination. The examining finger may touch the forehead and this may be mistaken for the vertex. After a time we are able to feel the forehead, the edges of the orbits, eyes, nose, nostrils, mouth with its hard alveolar ridges, and the chin. Sometimes, however, the face is swollen and distorted to such an extent that it may be mistaken for the breech. The simplest way to be sure of the diagnosis is to press on the alveolar ridges inside the mouth. These correspond to nothing found in the rectum, where, instead of hard ridges, we find slight action of the sphincter, which caused Parvin to make use of the expression, "The anus bites instead of the mouth." In making the examination it is always important to note the direction of the chin; the best guide to that is the nostrils, which point in the direction of the chin.

Mechanism of Face Presentations.—The mechanism of vertex presentations being known, it is a simple matter to get a clear conception of the mechanism of face presentations. In the latter the chin plays the same part that the occiput does in vertex presentations. As the head descends rotation must occur in the one case as well as in the other. In vertex cases, under normal circumstances, the vertex is the lowest part of the head in the pelvis; this is produced by flexion of the head. In face presentations the chin is the lowest part of the head in the pelvis and this is due not to flexion but to extension. Extension of the head turns the occipito-left-anterior into the right mento-posterior and so on, thus (Fothergill):

1. O. L. A. = M. R. P. Mentum right posterior.
2. O. R. A. = M. L. P. Mentum left posterior.
3. O. R. P. = M. L. A. Mentum left anterior.
4. O. L. P. = M. R. A. Mentum right anterior.

The order of frequency is: 1, 3, 2, 4.

There is some doubt as to whether the first or third face position, that is, the mentum right posterior or the mentum

left anterior, is the more common, but all are agreed that these two positions are far more common than the others—that is, in these presentations the face nearly always lies in the right oblique diameter the chin being to the left front or toward the right rear.

The mechanism is the converse of that in vertex cases.

There are four movements, (mentum right posterior):

1. Extension and descent.
2. Internal rotation—long rotation of chin to front through three-eighths of a circle.
3. Flexion.
4. External rotation.

Very rarely we have a malrotation with the mechanism as follows:

1. *Imperfect extension* or slight flexion with descent.
2. *Internal rotation*—short rotation of forehead instead of chin to front through one-eighth of a circle.
3. *Extension.*
4. *External rotation.*

This malrotation—i. e., the rotation of the forehead, brings the chin into the hollow of the sacrum, making it a persistent mento-posterior position, in which natural expulsion is nearly always impossible.

The three important movements in the delivery of normal face presentations are descent and extension, rotation of the chin to the arch, and delivery of the head by flexion. The fourth movement of external rotation which is generally described is less important.

The mechanism of the first position may be more minutely described as follows: When labor begins the forehead is lower down than the chin, during descent extension takes place which causes the chin to come lower down; next, a rotation takes place which turns the chin toward the pubic arch. The rotation of the chin is brought about in the same way as that of the occiput in normal labors—that is, by pressure against the posterior part of the pelvic floor, especially the strong sciatic ligaments. The right cheek, which is anterior, descends a little lower than the other, the mouth and chin appear at the vulva. As soon as the chin gets clear of the pubic arch flexion occurs by which the chin is pushed up in front of the symphysis pubis, while the nose, eyes, forehead and

vertex successively roll over the perinæum. After delivery of the head external rotation takes place.

Mechanism of the left mentum anterior presentation. As before, extension makes the chin descend lower than the forehead. As soon as the chin reaches the pelvic floor it is rotated forward to the right and toward the middle line, the chin is then delivered and

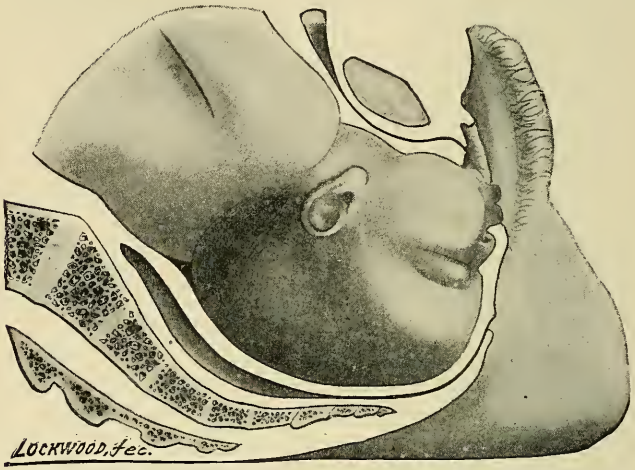


Fig. 103.—Diagram showing Delivery of Head in Face Presentation (Williams).

flexion follows as before, causing the mouth, nose, eyes, and forehead to appear successively, after which the occiput glides over the perinæum.

MANAGEMENT

When hydramnios is present abnormal presentations are frequent. When it is a face presentation it is desirable to change to a vertex before the liquor amnii has all come away. (See Treatment of Hydramnios.)

When there is a flat pelvis it is always better to turn. When there is a generally contracted pelvis it is better to change to a vertex presentation or to turn; probably version is the safer procedure.

In the great majority of cases Nature can complete the delivery without great difficulty. Such being the case, it is not necessary for the accoucheur to risk much in efforts to change the presentation according to the methods described by some obstetricians.

Active interference is therefore unnecessary, excepting in the cases above referred to.

Among the methods recommended the following are probably the best, although I should not advise physicians to place much reliance on them.

Herman's Method by Pressing on the Face and the Occiput.—Put two fingers in the vagina and the other hand on the abdomen, press the face up by pressure, first on the jaws and then on the forehead, and at the same time press the occiput down with the external hand. If you have succeeded in pressing the forehead above the pelvic brim, then use both hands outside, pressing the occiput downward into the pelvis with the one hand and pressing the face upward and toward the middle line with the other.

Schatz's Method.—Raise the shoulders and press them down toward the dorsal aspect of the child so as to undo the extension of the spine, at the same time steadying or raising the breech with the other hand applied near the fundus, so as to make the long axis of the child conform to that of the uterus; and finally, press the breech directly downward. As the child is raised the occiput is allowed to descend, and then as the body is bent forward head flexion is produced by the resistance of the side walls of the pelvis. The proper time for this manipulation is previous to rupture of the membranes.

When the head is in the pelvic cavity, with the chin toward the front, and the os, vagina, and vulva are fully dilated, apply the forceps if, after waiting one or two hours, satisfactory progress is not being made.

When the head is low in the pelvis with the chin posterior, and the os, vagina, and vulva are fully dilated, one should wait for a certain time, one or two hours, with the hope that the chin will rotate to the front. If this does not happen, the patient should be fully anæsthetized, the whole hand is introduced into the vagina, the face is grasped with the thumb on one side and fingers on the other and the head is turned so as to bring the chin to the front by the shortest route; at the same time, with the other hand on the abdomen, an effort is made to press the anterior shoulder in the same direction. I shall again refer to this procedure in speaking of difficult occipito-posterior positions.

Herman, who has given the most definite instructions as to this form of procedure, tells us that when the chin points directly back-

ward we should observe in which oblique diameter the shoulders lie, and move the chin in the same direction as that in which we press the anterior shoulder to get it to the front. When the chin is brought to the front we should apply forceps immediately and deliver.

If we are unable to deliver by any of the methods described nothing remains but a serious operation such as Cæsarean section, symphysiotomy, or embryotomy. As the chances of delivering a living child at this time are very poor the operation of embryotomy is the one most commonly performed.

Prognosis. The fœtal mortality is from 10 to 15 per cent., and the maternal mortality is a little above the normal. Labor is usually slow.

Treatment.—The treatment may be summed up as follows:

Keep the patient in bed and preserve the membranes intact as long as possible. No interference is required, as a rule. When there is a flat pelvis or prolapse of the umbilical cord employ podalic version (Dührssen). Schatz's method, producing "universal flexion" of fœtus by external manipulations, or Herman's method is occasionally practicable. After the os is dilated the membranes may be ruptured and the hand introduced into the uterus may flex the head. Forward rotation of chin may be assisted by pressing the forehead upward and somewhat backward, and occasionally by drawing the chin downward and somewhat forward by two fingers hooked over it during an interval between pains. It may be necessary to apply the forceps, or perform Cæsarean section, or symphysiotomy if child is alive, or embryotomy if child is dead.

Head Molding and Caput Succedaneum.—The vault of the head becomes flattened and pushed backward, while the frontal and occipital bones are bulged and curved. The diameters shortened are the suboccipito-bregmatic and the cervico-bregmatic. The diameters lengthened are the occipito-frontal (considerably) and the occipito-mental (slightly).

The caput succedaneum will be found to extend from the anterior angle of the mouth over the cheek to the level of the eyes and perhaps to the other half of the face. The disfigurement is so great that the friends should be warned before delivery, and the mother should not be allowed to see the child until the swelling has to some extent subsided.

BROW PRESENTATION

At one stage during the change from vertex to face presentation we have what is known as brow presentation, the prominence of the forehead being the presenting part. This is due to the fact that the two arms of the head lever balance each other. Generally in such a presentation we can feel the bridge of the nose or the supra-orbital ridges on one side of the pelvis and the anterior fontanelle on the other, at the same time the frontal suture occupies the same position in the center of the pelvis that the sagittal holds in vertex presentations. This is a very difficult presentation, although it is barely possible that without interference delivery may take place. During labor the forehead generally turns to the front and the occiput to the rear, the following parts appear successively at the vulva, forehead, eyes, and nose, after which the vertex and occiput glide over the perinæum, then the mouth and chin emerge under the pubic arch. The prognosis in such cases is bad for both mother and child.

Treatment.—Early in labor we should endeavor by manipulation to change the presentation into a vertex or face. If we are unable to do this try to perform podalic version. Sometimes the head may be delivered with the forceps. If all such efforts fail, cæsarean section, symphysiotomy, or embryotomy becomes necessary.

BREECH PRESENTATION

In a certain proportion of cases the breech presents instead of the head. The dangers to the child in breech labors are fairly well known but not always fully appreciated. In the most skilled hands probably 7 to 10 per cent. of the children are still-born. In some Charities, we are told by Herman that 30 per cent. or more perish during delivery. In other words, the excess in the mortality rate depending on want of skill in management sometimes amounts to 20 per cent. or more. The mortality among children in breech deliveries conducted by midwives in Great Britain is simply appalling. A country, however, which by act of Parliament converts the ordinary midwife into a legalized obstetrician, must inevitably suffer seriously from such extraordinary legislation.

Carelessness and ignorance as to proper methods of conducting breech cases are not, however, confined to midwives. My own experience and observation lead me to believe that many physi-

cians neglect to use proper and systematic methods in the management of these cases.

Version before labor in breech presentation has become somewhat popular in London, England, during the last few years, but is not often performed in the United States or Canada. The procedure is sometimes easy of performance and fairly safe in skilled hands. One can not, however, in any case be certain of getting a good vertex position after the version. It is, I think, better for the general practitioner to make no attempt at version, but to employ proper methods of extracting the child as quickly and safely as possible.

The main points as to classification, prognosis, causes, diagnosis, mechanism, and preparation may be summarized as follows, before speaking in detail as to the management of breech delivery.

Pelvic presentations are subdivided into: 1, Breech; 2, knee; 3, footling. The mechanism is nearly the same in all; the frequency is 2 to 3 per cent.; the prognosis is good for mother, bad for child. The child is still-born 1 in 10 cases, some say 1 in 5 cases.

The dangers to child are: 1, Suffocation from respiratory efforts before delivery of the head; 2, asphyxia from compression of cord after umbilicus has emerged from vulva; 3, stoppage of the fœtal circulation from uterine compression of placenta while head is in vagina; 4, injuries from efforts to deliver.

The causes are: Premature birth, twin pregnancy, fœtal monstrosity, excess of liquor amnii, death of fœtus, hydrocephalus, laxity of uterine walls, placenta prævia, contracted pelvis.

Diagnosis.—*Abdominal Examination.* The head is at fundus uteri (generally on one side), there are no small parts (limbs) felt beside the head, the heart sounds are heard above the level of the umbilicus, the limbs are felt lower down.

Vaginal Examination. The bag of membranes is broad and "pudding shaped" (Parvin), the bag of membranes descends low while the presenting part is high, the breech is softer than the head and without sutures, fontanelles, or hair.

The following parts may be felt: Trochanter major, groove between buttocks, genitals, spinous processes, sacrum, coccyx, and anus. (Anus "bites," Winckel.) Meconium escapes.

Differential Diagnosis of Knee and Elbow. The knee is broader, and has patella and two tuberosities with slight depression between them instead of sharp projections of olecranon.

Differential Diagnosis of Foot and Hand. In the foot the toes are nearly in a line and not very movable, the heel projects with malleoli above it. The internal border is broader and thicker than the external. The foot is at right angles to the leg. In the hand the thumb is shorter than the fingers, and may be separated from the index finger; the thumb and fingers are more movable than the toes.

Mechanism.—*Positions.* There are four positions as in head presentations. The sacrum in each points in same direction as occiput in vertex presentation, but mechanism differs, because the transverse diameter of the child's pelvis is longer than the antero-posterior, and a hip instead of sacrum rotates to front. The positions are:

1. Left sacro-anterior—L. S. A.
2. Right sacro-anterior—R. S. A.
3. Right sacro-posterior—R. S. P.
4. Left sacro-posterior—L. S. P.

The order of frequency is 1, 3, 2, 4.

MECHANISM OF FIRST OR LEFT SACRO-ANTERIOR POSITION

During descent the left or anterior hip becomes lower than the other. This movement corresponds to flexion.

When the anterior hip strikes the lateral half of the posterior segment of the pelvic floor it is rotated forward to the pubic arch.

This brings the intertrochanteric diameter into the antero-posterior diameter of the outlet.

While the anterior hip is passing under the pubic arch the posterior hip passes over the perinæum in a movement that corresponds to extension. This brings about "lateral flexion of the trunk." The shoulders come into the brim with their long diameter transverse; into pelvis with long diameter oblique; emerge from outlet with long diameter antero-posterior.

The head comes into brim with its long axis in the transverse diameter, and rotates during descent, the occiput coming to the front.

Stages in Delivery.—The stages in delivery are:

1. Compression or molding. Lessening of presenting part through propelling and resisting forces.

2. Descent of breech to pelvic floor.

3. Rotation of anterior hip into pubic arch, left hip in first position.

4. Delivery of breech and trunk.

5. Descent of head coming into oblique diameter,

6. Rotation of occiput to front.

7. Delivery of head by extension: first chin, then face, forehead, etc.

In all head-last cases the chin should be born first (Fothergill).

Management.—The following rules are recommended:

Make all preparations for restoring suspended animation in the child.

Instruct the nurse to have ready at hand water for hot and cold bath for the child.

Have at hand the soft rubber tube, with bulb attached, to clear child's pharynx.

Tell the friends the nature of the case and the risk to the child.

Avoid traction, because it may cause extension of arms over head and extension of head itself.

Leave membranes intact if possible until cervix, vagina, and vulva are dilated or dilatable.

Place patient in cross-bed position.

The last rule is one of extreme importance. The patient should be placed on her back across the bed, with the buttocks at the edge of the bed in the lithotomy or Walcher's position. One can not give proper assistance with the patient in any other position in the majority of cases. The patient should be put in this position shortly before delivery. Dührssen's rule is an excellent one, "Do this in the multipara when the breech enters the vagina, in the primipara when it is on the point of delivery."

Preparation of Physician.—He should make bare both arms up to the shoulders, or as nearly so as possible, and cleanse the hands and arms thoroughly. One might ask should not both hands and arms be clean in any case? Yes, they should; but very frequently even careful practitioners have only one hand and arm laid bare. In certain cases the physician can manage much better by withdrawing one hand after a certain manipulation, and introducing the other hand for another manipulation.

The critical time has come when the child is born as far as the umbilicus. The cord may be pulled down slightly, and should be

watched carefully. Any efforts to place it in a favorable position, as, for instance, in front of one of the sacro-iliac joints, as sometimes recommended, are, I think, useless.

The great danger which arises is compression of the cord between the head and pelvic wall. If pulsation in the cord ceases the child will die in from four to eight minutes if not delivered. Prompt action is therefore necessary, but traction should be avoided before delivery of shoulders, if possible. Pressure on the fundus should be made. An intelligent and skilled nurse is of much service in such a case. If the nurse is not skilled she should be told how to press on the fundus while the physician is handling the child. She should place her two hands on the fundus and press downward while the thorax and shoulders are being expelled. She should still press on the fundus, with the object of pushing the head through the pelvis. It is well at this stage to place the hands immediately above the symphysis pubis; locate the head and intelligently force it in the right direction, which is downward and slightly backward, while the physician is carrying the child forward, and at the same time using traction. If the physician has no assistant, he may press on the head with one hand above the symphysis, while the other seizes the legs or body of the child.

Rule as to Traction.—*Avoid traction* if possible *before* the arms are expelled. *Use traction after* the shoulders are born by shoulder-jaw traction with suprapubic pressure, as described under Difficult Pelvic Delivery.

Sometimes it is well to wrap flannel around the exposed parts of the child to prevent respiratory efforts which may be induced by contact with the cold air. This, however, often becomes an impediment to skilful manipulation and quick delivery, and is therefore in many cases useless if not harmful.

Difficult Breech Delivery.—Different circumstances may make a breech delivery difficult.

1. The breech may not descend into the pelvis after the parts are fully dilated.

2. The breech may descend into the pelvis, but the uterine contractions, together with pressure on fundus, may fail to expel the fœtus.

3. Delivery fairly easy up to a certain point may become difficult from extension of child's arms beside the head.

In all these cases active interference with more or less traction becomes necessary.

If the breech does not descend into pelvis within an hour or two after the os is fully dilated the following directions may be followed:

Bring down a leg. It is better as a rule to anæsthetize the patient and perform the operation before all the liquor amnii has escaped.

Pass up the hand with its palm toward the child's abdomen.

Support the uterus with the other hand on fundus externally.

Seize the anterior foot if possible.

If the legs are extended on the thighs so that the feet are close to the head, the hand must be passed up to the fundus. On reaching a knee press it outward and backward, then push the hand farther and seize the instep or foot. Carry the foot to the opposite side of the fœtus, then bring it down.

When interference becomes necessary, after the breech has descended into pelvis, it is better even then to endeavor to pass up the hand and bring down a foot; but full anæsthetization is desirable, and great gentleness and caution are necessary.

It is especially dangerous to wait until the ring of Bandl is high up, showing that the lower uterine segment is much stretched and thinned.

In some cases it is impossible to bring down a leg safely. In such a contingency the following alternative procedures are recommended.

Digital Traction.—Sometimes when breech is close to perinæum digital traction may be sufficient. Hook index finger in the flexure of anterior groin and use traction, or make traction alternately on the anterior and posterior groin, or make traction simultaneously on both groins, using the two index fingers.

Soft Fillet.—A soft fillet, such as an oiled handkerchief, may be passed round one (the anterior if possible) or both thighs, so as to press on the groin or groins (not the thighs.) A gum elastic catheter threaded with a loop of string may be used to pass the fillet around the groin.

A blunt hook may be pressed over anterior thigh, but it is dangerous to a living child.

Forceps may be applied, the axis-traction being probably the best.

Embryulcia.—In certain cases of serious impaction of the breech, in which a leg can not be brought down, embryulcia becomes necessary. Such cases fortunately are rare.

Rules.—The following rules for the liberation of arms when extended beside the head are recommended:

Elevate child toward mother's abdomen, using moderate traction.

Try to liberate posterior arm.

Use hand that naturally faces abdomen of child and introduce until two fingers reach elbow.

Some prefer to pass the other hand along the back of the child and behind the posterior arm as far as the elbow (McIlwraith prefers this method).

Draw arm across child's face and then downward.

Then bring hips downward and make traction on thighs, as there may be now room for head and remaining arm.

If not, try to liberate the anterior arm.

If unable to do so, push child backward into the pelvis to avoid dislocating the atlas, and rotate the body so that the arm that was the anterior will become the posterior.

During this rotation the back of the child should sweep across the front of the mother's pelvis.

Bring down the arm as before with other hand.

Nuchal or Dorsal Displacement of Arm.—Very rarely the arm is extended by the side of the head and is bent at elbow, so that the forearm lies behind the neck.

Treatment.

1. Place fœtal body downward, pass fingers along the back behind the symphysis, seize the elbow, then sweep the arm outward and over fœtal face, or

2. Rotate fœtal body in a direction opposite to that which produced the displacement.

3. It may sometimes be necessary to fracture the arm.

Methods of Delivery of the After-coming Head.—*Veit-Smellie, Levret-Veit or Shoulder-jaw Method.* Apply two fingers of one hand to lower jaw (in the mouth) and fingers of the other hand over back of the nape of neck and pull with both. Dr. Matthews Duncan stated that from his experiments he proved that 46 pounds may be applied in dragging down the lower jaw in some cases without producing any injury to the parts.

Smellie's Method. Apply fingers of one hand over superior maxillary bones at sides of nose and pull face down, while fingers of other hand push occiput toward sacral cavity.

Wigand-Martin Method. Place two fingers of the one hand, whose palm corresponds to the face, in the mouth, pulling on the lower jaw—the baby being on the same arm in such a way that the abdomen lies on the forearm with the baby's arms and thighs on either side—the other hand pressing over abdomen on the head.

Prague Method. Take the child's ankles in one hand and apply the fingers of other hand over the nape of the neck and pull first

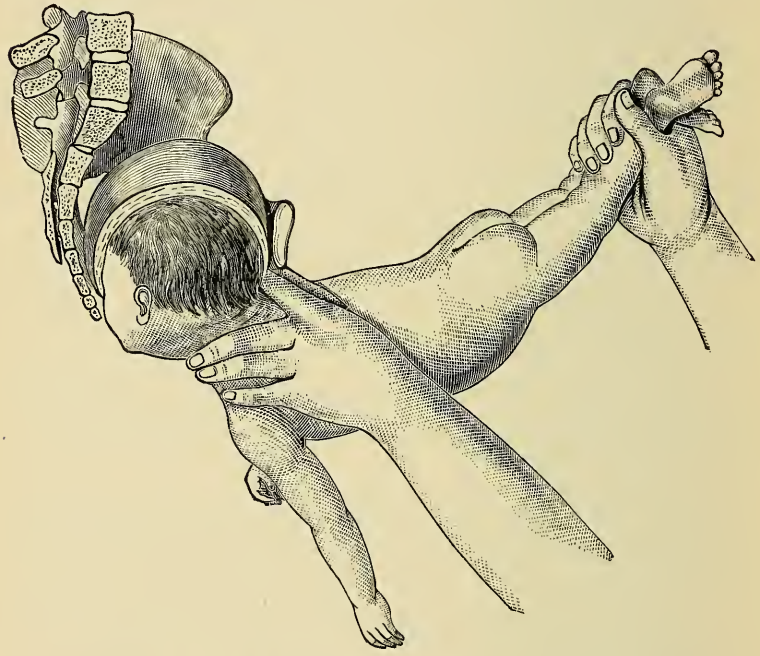


Fig. 104.—Prague Method of Extracting the Head (Lusk).

downward and backward until the head has entered the pelvis, and then upward and forward.

Forceps. Preferably the axis-traction.

Delivery after Embryulcia.

Malrotation of Head. When the occiput remains in the hollow of the sacrum hold the head and trunk by the shoulder-jaw, grasp

and rotate them until occiput comes to the front and then complete delivery.

If rotation can not be accomplished in this way, some say that

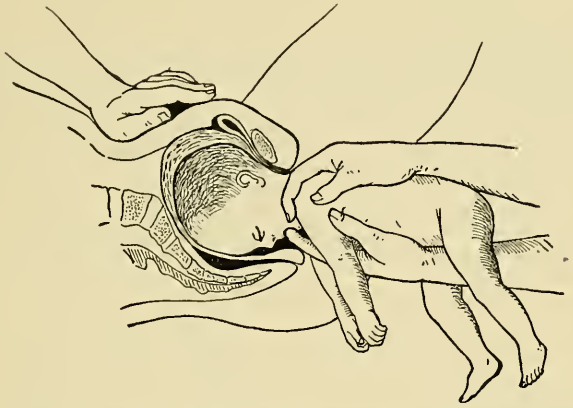


Fig. 105.—Shoulder-jaw Traction, downward and slightly backward, with Suprapubic Pressure.

the body of the child must be swung backward instead of forward and the chin and face brought out under the pubic arch.

Formerly the aftercoming head was generally extracted with forceps, but since the admirable continental methods have been

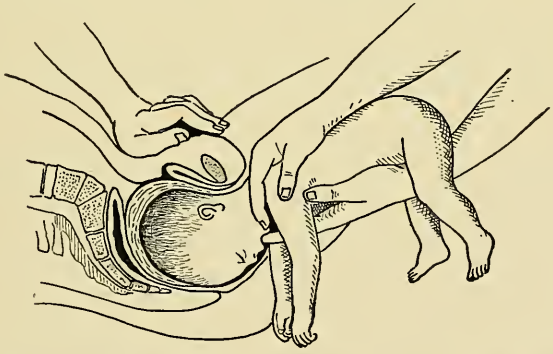


Fig. 106.—Shoulder-jaw Traction, chiefly forward, with Suprapubic Pressure.

adopted the use of this instrument is rarely necessary. The Prague method is said to be dangerous for the child. This is not true when the method is used with ordinary care. It answers well in some

cases, as the head may thus be delivered easily and quickly. It is not so efficient in difficult cases as some of the other methods.

It is important to take one definite line of action. The following is recommended:

Pull on nape of neck and lower jaw, the assistant at the same time pressing on the head through the abdominal walls. This is called in another section shoulder-jaw traction with suprapubic

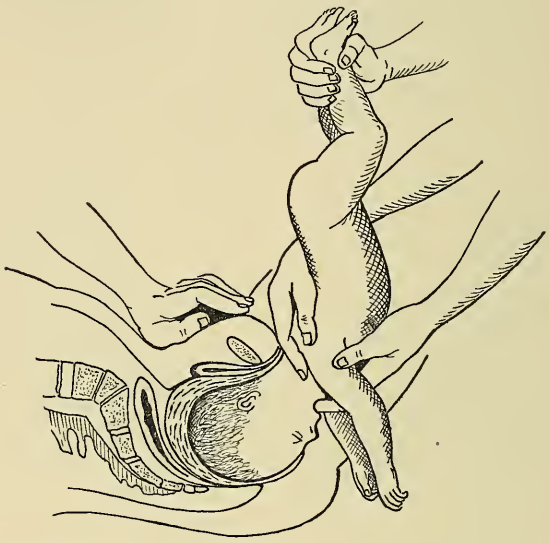


Fig. 107.—Shoulder-jaw Traction, upward Traction with Hand grasping the Ankles, and Suprapubic Pressure.

pressure and is practically a combination of the Veit-Smellie and the Wigand-Martin methods. This will accomplish delivery in a short time in the great majority of cases.

If it fails, try the Smellie method. Remove the fingers from mouth, and apply them at the sides of the nose, and slip the fingers of the other hand up to occiput. Some object because "greased" fingers can not do much against the "slippery skin" of the fœtus. This is to some extent true, but the aim should be now to increase the flexion of the head, then go back to jaw and shoulders, and again pull. Two assistants may be profitably employed in some cases. Let one press on the head from above, and the other hold the ankles upward, using traction, while the operator uses the

shoulder-jaw pull. This is a combination of the Veit-Smellie, Wigand-Martin, and Prague methods, and is sometimes the most efficient plan that can be adopted. I prefer to call it shoulder-jaw traction, upward traction with hands grasping the ankles, and suprapubic pressure.

While it may be conceded that the methods described are the best in the majority of cases, the forceps should not be ignored. This instrument properly sterilized should be in readiness. It occasionally happens that the operator can extract the head with the forceps after the "continental" methods have failed. Before applying the forceps draw the child forward and upward toward the mother's abdomen, and introduce the blades from behind.

MULTIPLE OR PLURAL PREGNANCIES

When the uterus contains two, three, four, or five fœtuses the pregnancy is multiple or plural. The following terms are used according to the numbers: Two fœtuses, twins; three, triplets; four, quadruplets; five, quintuplets. The corresponding names applied to the pregnancies are double, triple, quadruple, quintuple. I think there is no authentic record of more than five children at a birth.

Frequency. Double pregnancy occurs about once in 100 pregnancies; triple, once in 6,000; quadruple, once in 400,000; quintuple, extremely rare.

Sexes. The sexes of twins are as follows: Both girls in 30 per cent., both boys in 34 per cent., a boy and a girl in 36 per cent. of cases.

TWINS

Uniovular Twins.—Twins may develop either from a single ovum or from two distinct ova discharged from the same Graafian follicle. The two Graafian follicles may exist in one ovary, or each of the two may exist in a different ovary. In the one case two corpora lutea will be found in one ovary; in the other case one corpus luteum will be found in each ovary. There are two varieties of uniovular twin pregnancies:

(*a*) The twins are developed from two centers in two yolks.

(*b*) The twins are developed from the two halves of one center —that is, the two portions formed by a splitting of a single area germinativa.

When twins are developed from two centers in one ovum the

placenta, the chorion, and the reflexa are, as a rule, common to both. This is generally recognized as a fact, but, strictly speaking, we do not find, even in the uniovular twin pregnancies, a single placenta, because in all cases the embryonic portion is of individual origin. We have really a double placenta in early fœtal life; the two placentæ are, however, in close proximity and a certain amount of fusion takes place with more or less superficial and deep anastomosis of the blood-vessels. At full term, therefore, we have apparently a single placenta, and for practical purposes we should consider it as such. In most instances each fœtus is contained in its own amnion; in certain cases, however, we find only a single amnion, the two having become merged into one, the original wall separating them having undergone absorption.

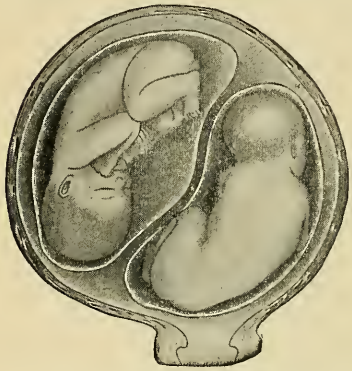


Fig. 108.—Diagram showing Position of Twins in Utero.

One head and one breech presenting.

It is said by some authors that twins from one egg are of the same sex. This is not always true with respect to twins developed from two yolks in the one egg. Under such circumstances twins may be both girls, both boys, or a boy and a girl. There is frequently a great difference in twins both as to size and development. Such disparity is common in uniovular twin pregnancies in consequence of the anastomoses existing between the placental vessels of the two embryos. The growth of the embryos varies according to the quantity of blood supplied to each. Schultze reports a striking example where one child at birth was nearly, if not quite, mature, while the other presented the appearance of a six weeks' fœtus.

Acardiac Monster. When one embryo is weaker than the other the heart of the stronger may overcome that of the other, the blood is forced from the placenta along the umbilical arteries of the more feeble embryo. There is not, however, sufficient force to carry the current to the upper parts of the body. As a consequence, the heart and all portions of the fœtus above the heart remain undeveloped and the result is an acardiac monster.

Probably the most extreme form of disparity between twins is when one grows and thrives at the expense of the other. In such a case the favored one absorbs all the nutriment originally intended for both; the weaker embryo soon dies, and becomes, when squeezed for some time against the uterine wall, a fœtus papyraceus, or degenerates into some form of mole. Such blighted fœtus, or mole, being excluded from the air, does not become putrid before the onset of labor. A fœtus papyraceus is sometimes found in triplet pregnancy when two fœtuses survive (Fig. 109).

Fig. 109.—Fœtus Papyraceus.

Triplet pregnancy, other two born alive and healthy. (Dr. Neff Ingersoll, Univ. Tor. Museum.)

The second variety of uniovular twin pregnancy is interesting, and at the same time fortunately rare. Generally, if not always, in such cases there is a pathological condition. In certain cases the single area germinativa is completely and evenly divided, resulting in the development of twins enclosed in the same amnion. According to Ahlfeld, the division when complete produces twins enclosed in the same amnion, which are not only of the same sex but bear to one another through life the most striking similarity as regards appearance, physical peculiarities, as well as mental and moral characteristics. When, however, the division is incomplete,

the result is conjoined twins, forming one of the most frequently occurring varieties of double monster.

Binovular Twins.—When the twins develop from two ova each fœtus is surrounded by its own amnion and chorion. If the ova in the decidual membrane are separated sufficiently far from each

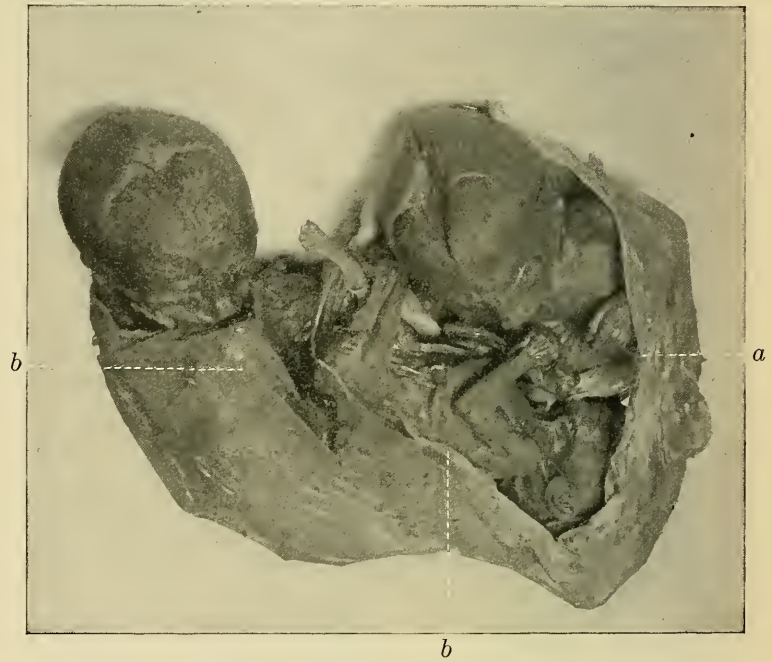


Fig. 110.—Triplets from Two Eggs.

One sac, *a*, contains one placenta and two fœtuses, second sac, *b*, *b*, one placenta and one fœtus. Both sacs ruptured.

other the two placentæ will be separate, and each ovum will have its own decidua reflexa. Sometimes, when situated nearer each other, the two placentæ are united at their borders, each having its own independent circulation. This variety of twin pregnancy (developed from two eggs) is by far the most common, and, as a consequence, there are two distinct bags of membranes in a large majority of cases (about 85 per cent.).

Triplets may develop from three distinct ova, or two from a single ovum and one from a second ovum. In three-egg triplets there are three placentæ and three distinct bags of membranes (Fig. 111).

In two-egg triplets there are one-egg twins, with generally one placenta, chorion, and reflexa, and a third fœtus with its placenta and bag of membranes (Fig. 110).

Superfecundation.—Generally, in connection with binovular twins, we consider that two ova have been fertilized at one coitus. But we know that one egg may be fertilized at one time and a second at another time. This has been proved by the fact that a woman has been delivered of twins, of which one was black and the other white. In such a case as this one egg must have been fertilized by a black father and the other by a white. Such fer-

Fig. 111.—Triplets from Three Eggs.

Three placentæ, three sets of membranes; *h, h, h,* heads; *c, c, c,* cords; *p, p, p,* placentæ. (Tor. Univ. Museum.)

tilization of two eggs is called superfecundation, and has occurred during one intermenstrual period.

Superfœtation.—When one egg is fertilized and lies within the uterine cavity we have a normal pregnancy. If, in connection with a subsequent menstrual period a second egg is fertilized we have what is called superfœtation. Many are the discussions which

have taken place respecting the possibility of such an occurrence. Twins show frequently a great disparity and such unequal development has often been considered as proof of superfœtation. A great many think that superfœtation may possibly occur before the decidua vera and reflexa have become united; that is to say, within three or four months after conception. Spiegelberg considers that superfœtation is a physiological impossibility, because physiological ovulation always ceases as soon as pregnancy has commenced.

It is well to remember that twin pregnancies occasionally occur in which one embryo is developed within and the other outside the uterus.

Pathological Conditions.—Twin pregnancies probably end prematurely in more than half the cases. One of the twins may survive and thrive at the expense of the other, as already indicated. The weaker embryo may die and be expelled; generally the dead embryo is not expelled but becomes a mummified mass. Vesicular degeneration of the chorion, forming a hydatid mole, is not uncommon. Monstrosities are somewhat frequent. Various accidents may arise in utero from crossing and twisting of the cords.

Presentations of Twins.—The following presentations are most frequently met with: Vertex in both twins, 50 per cent.; vertex and breech, 35 per cent.; pelvis in both, 10 per cent.; transverse in one, 3 per cent.; other varieties, 2 per cent.

Diagnosis.—It is exceedingly difficult to make a diagnosis of multiple pregnancy with certainty. Unusual enlargement of the uterus may create a suspicion of such a condition; the patient herself is apt to think of twins when the uterus is unusually large. Such increase in size, however, furnishes no direct proof because it is quite as apt to be due to the presence of a very large child or to an excess of the amniotic fluid. Occasionally it may be noticed, when the uterus is greatly enlarged, that the surface of the abdomen is traversed by a groove. One may sometimes obtain trustworthy information by palpation and auscultation. Thus, if hydramnios were excluded the recognition of a number of different fœtal parts would point to the probability of twin pregnancy. The probability might amount, perhaps, to certainty when two fœtal heads can be outlined at a distance from each other. When the fœtal heart sounds are heard at two remote points and the sound dies away in the intervening space it may be presumed that

twins are present. In the great majority of cases, however, no diagnosis is made until after the birth of the first child; the presence of the second is then determined by the ordinary signs, easily detected both externally and internally. It is practically impossible to make a certain diagnosis of triplets and quadruplets.

Diagnosis of multiple pregnancy. The uterus is unusually large (this may, however, be due to the presence of a large child or to hydramnios). There is sometimes a groove on the surface of the abdomen. The fœtal heart sounds are sometimes heard at remote points. Two heads are sometimes felt. Suprapubic œdema is nearly always present.

Management of Labor.—Few directions are required as to the management of labor in multiple pregnancies. Put two ligatures on the cord and cut between them for fear of vascular communication between the placentæ. After the first birth allow the mother to rest for a time. Keep uterus contracted by external manipulation or by the application of an abdominal binder. After half an hour rupture the second bag of membranes if intact. Then aid delivery if necessary by external pressure or by the use of the forceps.

PART II

PATHOLOGICAL AND OPERATIVE OBSTETRICS

CHAPTER X

DISEASES OF PREGNANCY

The pregnant woman is subject to the same diseases that attack the non-pregnant. These diseases are sometimes called intercurrent diseases or complications of pregnancy. In addition, the pregnant woman may suffer from diseases due to the changes taking place in the uterus and the whole body in consequence of the growth of the fructified egg. There are several classifications of these diseases of pregnancy, but none is entirely satisfactory. Perhaps the best method is to discuss them as they affect the various systems of the body.

Diseases of the Digestive Organs.—Some of the diseases of the digestive organs are among the most common and sometimes the most serious. This is especially true of diseases of the stomach and intestines. No disease of pregnancy should be considered insignificant. On the contrary, each disorder causes a certain amount of inconvenience at least, sometimes much more than a careless obstetrician is apt to realize. These diseases are, whether slight or serious, frequently difficult to cure; and it is often hard to decide whether medication or Nature has effected a cure. Our duty is, however, always to endeavor to relieve the patient no matter how trifling her ailment may appear to be.

SALIVATION OR PTYALISM OF PREGNANCY

This is not a common affection, but it is sometimes very troublesome and distressing. It is most common during the early months, but it may continue until the end of pregnancy. The chief symp-

tom is a constant dribbling of saliva during both day and night. The saliva is generally changed in character, being more watery. The digestion may be impaired through the diminution of the ptyalin.

Treatment.—*Laxatives.* The most efficient are probably salines or cathartic mineral waters, such as the Hunyadi Janos. Any of the astringent mouth washes may be used, such as solutions of tannin or sulphate of zinc.

℞ Extracti belladonnæ $\frac{1}{4}$ gr. three times a day.
℞ Pilulæ atropinæ $\frac{1}{120}$ gr. twice or three times a day.

King recommends the following gargle:

℞ Sodii boracis glycerini..... ℥ ii;
Aquæ Rosæ..... ℥ vi.

Use as a gargle three times a day.

Belladonna or atropine sometimes causes a peculiar dry condition of the mouth which is more objectionable to the patient than the excessive secretion of the saliva.

Tonics such as strychnine, arsenic, and iron, with a generous diet sometimes do much good. Iron should be used with care, however, if the stomach is in an irritable condition, as it frequently is. In a patient of mine, confined last August, profuse ptyalism commenced about three weeks after conception and persisted throughout pregnancy in spite of treatment by laxatives, mouth-washes, atropine, and tonics. Atropine diminished the flow of saliva, but caused such an unpleasant sensation that the patient soon refused to take it. After labor the ptyalism still continued for three weeks, diminished during the fourth week, and ceased entirely in the fifth week.

DENTAL CARIES AND TOOTHACHE

Caries of the teeth is somewhat common during pregnancy. Dental operations of a serious nature are not advisable on account of the danger of inducing abortion through shock. The treatment of the decaying tooth should, as a rule, be temporary in character. For those who show a tendency toward dental caries prescribe the following:

℞ Syrupi calcis lactophosphati, ℥ i, three times a day. If the pain of toothache is very severe it may be advisable to administer

morphine by mouth or hypodermically, but it is better to avoid it if possible. For toothache with a neuralgic element prescribe:

℞ Fluidi extracti gelsemii gtt. iii-v, three times a day until slight ptosis occurs.

External applications to face may be made, such as Linimentum belladonnæ, Linimentum aconiti, Linimentum chloroformi, Linimentum opii.

DERANGEMENT OF THE STOMACH

The worst form of this is the so-called uncontrollable vomiting.

A Typical Case.—Mrs. C., married at twenty-seven. Had always been healthy. Became pregnant three months after marriage. In the second month had retching and vomiting, which grew worse in the third month. Became rapidly emaciated. Mouth dry and parched, tongue red and glistening, breath offensive. After various medicines had been administered, local cervical applications of silver nitrate and tincture of iodine were made. Slight improvement followed for a short time. In a week she again commenced to fail and rapidly grew worse. There was almost constant retching and frequent vomiting of greenish-colored mucus, sometimes streaked with blood. The gums became swollen and the teeth were covered with sordes. The face became so much pinched and her expression was so much changed that her acquaintances could hardly recognize her. A beautiful, healthy, and happy girl had become transformed, in a few months, to a haggard, distressed-looking, wrinkled old woman. I was called to see her in the country with a view of inducing abortion in the fifth month. It was too late. She was dying when I reached her. I may add that I think this patient was skilfully treated, but she and her husband (a physician) were so anxious to have no interference with the pregnancy that the last resort (the emptying of the uterus) was delayed too long.

Symptoms.—Nausea and vomiting, usually commencing in the second month, accompanied by emaciation and weakness, are the chief symptoms. In time nothing but bile-stained and bloody mucus comes from the stomach. The lips are cracked; the teeth are covered with sordes; the tongue is fiery red and glistening; the urine is scanty and contains albumin and casts. The temperature is generally elevated, especially when the end is near. The skin, especially of the face, becomes dry, harsh, and wrinkled. There is a foul odor from breath, and finally delirium and coma. It is strange, as pointed out by Spiegelberg, Reynolds, and others, that vomiting of pregnancy rarely results in abortion, although this

accident is frequently induced by severe vomiting due to accidental gastric disturbances.

Treatment.—Regulate the diet. In some cases, during the early stage, it may be well to give the stomach an absolute rest for one, two, or more days, the patient taking only water. Sometimes nutrient enemata are administered at the same time, but in a large proportion of cases they are not well borne.

Enemata of salt solution or artificial serum generally produce more satisfactory results than the nutrient enemata. They are better borne, dilute the toxins which are usually present, furnish the needed liquids for the body, and effect a true *lavage* of the blood (Condamin). The best plan is to inject as high as possible 10 to 12 ounces of the salt solution or the artificial serum, and repeat often enough to use 4 pints in twenty-four hours. When the rectum is intolerant a few drops of laudanum should be added to each enema. If the rectum still rebels subcutaneous injections should be administered. The stomach should be kept absolutely empty for seven to fourteen days.

In milder cases, when the stomach is not altogether intolerant, small pieces of ice may be sucked. Frequently hot water will have a better effect. Effervescent drinks, such as carbonic acid water or champagne, may be tolerated by the stomach when plain waters are not. Sometimes it is well for patients to take a small meal before getting out of bed—e. g., a small cup of coffee and a biscuit. Or the patient may be wakened between midnight and early morning and eat a small meal, after which the lights may be at once extinguished and she may have another sleep.

Give liquid diet, in small quantities frequently repeated, in preference to solids, the order of selection as follows: Buttermilk, kumiss, milk with soda-water, iced milk. Meat soups, either beef or chicken, carefully freed from grease. Hot soups, however, are sometimes not well borne on account of their tendency to cause flatulence. Well-cooked farinaceous liquids, such as barley water and rice water. Scraped beef, lean and raw, alone or spread on very thin bread, may be tried; also, somatose, lacto-somatose, or lacto-globulin. Lavage, or washing out the stomach through a tube, sometimes does good.

With reference to hygiene, sexual intercourse should be prohibited. In the early stages it is not well as a rule to keep the patient in bed, but she should not do much active work.

Among the host of medicines proposed I shall mention the following: Calomel, 1 gr., ¼ every half hour for four doses; follow with a seidlitz powder or other saline cathartic if necessary; wine of ipecacuanha, one drop in a teaspoonful of water, every fifteen to thirty minutes. (I have seen this stop nausea in a number of cases. It is more likely to have a good effect if given when nausea begins and before vomiting has taken place. If three or four doses are given without any effect it is generally useless to continue it any longer.) Chloroform, two or three drops in a tablespoonful of cold water, occasionally; chloral hydrat., 20 to 40 grains per enema; morphine, ¼ grain hypodermically; bismuth subnit., 20 grains before meals; cerium oxalate, 5 to 10 grains before meals; tinct. iodin., 5 to 10 drops in water three times a day; liq. arsenicalis, one drop in water three times a day; muriate of cocaine (3 per cent. solution), 10 to 20 drops.

Among other remedies recommended are menthol, orexine, potas. iodid., nitric acid, phosphoric acid, sod. bicarb., creosote, naphthol, salicin.

Local Treatment.—Certain forms of local treatment are highly favored by some obstetricians. Among these one of the most common is the application of certain solutions to the os uteri. One of the oldest remedies used in this way is nitrate of silver in solution, 20 to 30 grains to the ounce; a solution of cocaine 5 to 10 per cent. may be used; tincture of iodine has also been used. Such treatment is supposed to be especially useful when cervical erosions exist. Such erosions should be touched about once in three days with these solutions. Where there are no erosions the solution should be painted over the vaginal portion of the cervix and also in the cervical canal, taking care not to make the application too high for fear of inducing an abortion.

Operative Treatment.—Copeman's Dilatation of the Cervix.—Copeman practised dilatation of the cervix with the finger. Many agree with Copeman in considering that such dilatation often serves a good purpose; others, while agreeing with Copeman, prefer to dilate with a steel dilator. Kehrer thinks that tamponing of the cervical canal serves a better purpose than dilatation either with the finger or a steel instrument. He first pushes a funnel of gauze into the cervical canal and then packs with narrow strips of the same, taking care not to invade the uterine cavity. Although it is true that either of these methods may in certain cases induce

abortion, still we find that in a large proportion of cases such dilatation produces no injury.

Correction of Displacements, if Any.—Graily Hewitt believes that displacement of the uterus is often the cause of the disease, and that a correction of the malposition will frequently effect a cure. Such displacement does certainly sometimes cause vomiting during pregnancy. In all cases, therefore, of displacement of the uterus endeavors should be made to correct it.

Induction of Abortion.—When all simple measures fail the last resort should be the induction of abortion. It is difficult to give any fixed rule as to when this operation should be performed. Each case should be studied very carefully. In some instances the patients have very serious symptoms, which may suddenly disappear. After such disappearance the patients often pass through the later months of pregnancy with comparative comfort. One should make it a rule, however, never under any circumstances to perform such an operation without a consultation.

DISORDERS OF INTESTINES

Constipation.—There are many reasons why constipation during pregnancy should receive the most careful treatment. (See the Hygiene of Pregnancy.) The ordinary toxæmia of pregnancy, which so frequently causes eclampsia, is largely and sometimes wholly due to constipation.

Dietetic Treatment.—One of the most important factors is the free consumption of water. Many women are unusually thirsty during pregnancy, but the thirst may be abolished by inattention, mental preoccupation, or other causes. Not less than two quarts of liquids should be consumed during twenty-four hours. Among liquids I should recommend first, all waters taken hot or cold, carbonated or pure; buttermilk, kumiss, bouillon, weak tea or coffee. In selecting solid foods, one should avoid those that are concentrated, and choose a good proportion of coarse grains and vegetables. The following may be included in the diet lists: White bread, brown bread (both of which should be at least one day old), toast, hominy, porridge, potatoes, turnips, cabbage, cucumbers, tomatoes, salads, cauliflowers, spinach, boiled onions, string beans, green corn, asparagus, green peas; fruits both raw and cooked—especially apples, figs, peaches, stewed prunes, cherries, grapes, grape fruit, oranges; meat or poultry once a day, fish.

In any case the patient should avoid any food which is found to cause indigestion. Milk frequently causes indigestion; but, in addition to this drawback, its residue in the intestinal canal is apt to be formed into hard or scybalous masses which do much harm, especially to those disposed to constipation. It is better in all cases to give definite rules in writing.

Hygienic Treatment.—Advise a fair amount of exercise, such as walking in the open air, a reasonable amount of ordinary housework, etc. The patient should have meals at regular times, eat slowly, masticate the food thoroughly; go regularly to the water-closet at stated times; employ, as nearly as possible, the "squatting" posture during defæcation. The latter is, of course, difficult with most of our modern closets, which are so constructed that the patient when sitting can barely touch the floor with her feet. Such faulty position can, to a large extent, be corrected by placing something on the floor, from six to twelve inches high, upon which the feet may rest. If then the patient crosses the hands on her lap and bends over she can nearly, or quite, assume the "squatting" posture.

Medicinal Treatment.—While the aim should be to depend chiefly on proper regulations as to hygiene and diet it will be found necessary to administer medicines in a large proportion of cases. The following rules may be followed: Be careful to avoid strong purgatives and large doses of the milder laxatives. Do not choose drugs whose doses require to be increased from time to time, but rather those whose dose may be gradually diminished. In all instances study carefully the idiosyncrasies and susceptibilities of the patients. Do not continue any one or two drugs for a long time. Many changes may sometimes be advisable. The following is a list from which to choose: Calomel, cascara sagrada, aloes or aloin, rhubarb, magnesii sulphas, sodii sulphas, sodii phosphas, soda tartarata, potasii tartras, saline mineral waters, podophyllin, senna, olive oil, castor oil, tamarind, strychnine, belladonna, ipecacuanha, enemata, glycerine suppositories.

I place calomel at the head of the list with some reluctance because I do not consider that it is the best medicine for simple uncomplicated constipation. Auto-intoxication, however, is so generally associated with habitual constipation that a certain amount of calomel, followed by mild laxatives, will generally produce good results.

Diarrhœa.—Although in the vast majority of cases diarrhœa may not cause any alarm, it is well to bear in mind the fact that it may induce abortion. Severe diarrhœa may occur without any discoverable cause. In such cases the passages are profuse and frequent, and accompanied with tenesmus. The patient becomes emaciated and exhausted in spite of careful treatment. Hess applies to such cases the term intractable and reports a case in which death ensued. In a series of 3,674 pregnancies in the Turin Maternity purely nervous diarrhœa occurred in thirty-five cases.

Treatment. To check a sharp diarrhœa there is generally nothing better than opium in the form of a pill, dose 1 gr., or deodorized laudanum, 15 minims (1 gm.). The diarrhœa may, however, be due to, or associated with, toxæmia, when caution in the use of opiates is necessary. Calomel may be given before, during, or after the administration of opiates. When there is nausea or vomiting use the ordinary suppository of lead with opium. If the diarrhœa appears to be due to nerve disturbances give nerve sedatives, such as sodium bromide grs xv (1 gm.), three times a day.

ENTEROPTOSIS OR GASTROPTOSIS

Glénard, in 1887, described a downward displacement of the stomach (gastroptosis) with usual displacement of the smaller intestine (enteroptosis), of the large intestines (coloptosis), and sometimes of the right kidney. The term splanchnoptosis has been applied to downward displacement of the abdominal viscera. These displacements are particularly interesting from an obstetrical point of view.

McPhedran considers that the condition is very common in patients presenting symptoms of mal-assimilation with or without digestive disturbances, although ptosis of the stomach is often present in persons presenting no such symptoms.

I have seen several patients in past years suffering from gastroptosis, who have greatly improved during pregnancy.

Maillart has been studying this condition in connection with pregnancy for years and says he has been frequently astonished to see the change produced by pregnancy in emaciated victims of enteroptosis and gastroptosis, who became strikingly plump. After delivery the recumbent position tends to keep the organs in place, but relapses frequently occur after the woman rises.

DISEASES OF THE CIRCULATORY SYSTEM

Anæmia.—Without any reference now to the normal conditions of the blood in pregnancy, which have been already discussed, we have to recognize the fact that in abnormal conditions during pregnancy there is frequently a decrease of the red corpuscles and with it a decrease of albumin.

Among the most common results of this are mal-assimilation, muscular weakness, impaired activity of secretory organs, increased nerve irritability, attacks of faintness, palpitation, and præcordial pain. The arterial tension is lowered and venous hyperæmia follows.

It is very difficult in some cases to decide as to when the anæmia of pregnancy has taken on a distinctly pernicious form. As the latter generally rises by slow gradations from the former no sharp line between them can be drawn.

Treatment. The treatment of anæmia should be largely prophylactic and should be undertaken as soon as the first symptoms of the condition appear.

Many obstetricians, perhaps the majority, place the administration of iron in the front rank of remedial measures. I believe that, in the majority of cases, iron is not well borne by pregnant women.

The anæmia, in a large proportion of cases, is caused by some form of toxæmia, as stated more fully hereafter. Such being the case, our first efforts should be in the direction of eliminating the poisonous products.

It is difficult to give any definite rules as to diet. Sometimes it is well for the patient to take small quantities of simple nourishment at short but regular intervals, instead of three large meals a day as in health. That kind of simple food which, in the past, has agreed with the patient's stomach should, as a rule, be selected. Soups and broths should generally be omitted. In many cases when ordinary meat, such as beefsteak and mutton, does not answer, a little scraped raw or very much underdone meat may be assimilated. If evidences of toxæmia, and particularly of renal insufficiency, do not exist, the newer condensed and desiccated powdered preparations of albumin, such as somatose and tropon, may be found useful. Other albuminoid food preparations are also recommended, such as eucasin, lacto-globulin, plasmon, and sanose.

Administration of Tonics. I prefer such tonics as strychnine, zinc, and the vegetable bitters, together with some of the soda or lime compounds; some elixirs, such as those of strychnine, bismuth, and pepsin, or the glycero-phosphates of soda and lime.

Varicose Veins.—Varicose veins are very common in pregnancy and are found more frequently in multiparæ than in primiparæ. The saphena is the vein first affected, then its lateral branches upon the inner side of the thigh and leg, and occasionally the veins of the vulva. The hæmorrhoidal veins are also frequently affected.

Treatment. We can not cure varicose veins, but we should undertake a certain line of treatment as soon as we find them present. One should have two aims in view: 1, To prevent the increase of the dilatation and at the same time afford some relief to the symptoms; 2, to guard against the dangers of rupture.

One should endeavor to accomplish the first aim by furnishing mechanical support of the enlarged veins. This is generally done by the use of the elastic stocking or by an ordinary roller bandage. A well-fitting stocking often affords a great comfort and is fairly effective. It is very important that it be so made as to fit snugly but not too tightly; and, as it is apt to stretch and get loose, frequent changes are required. The stocking, with the changes generally required, is expensive and perhaps not so effective as a carefully applied roller bandage. Some consider that a flannel bandage is more effective.

Lusk insists that the patient should always be provided with a compress and bandage, which she should be taught to apply herself in case of a sudden and serious hæmorrhage in the absence of professional or other assistance. Reynolds recommends furnishing her with a small pad of folded linen, to which a strap and buckle have been sewn, and that she should be shown how to apply it over a bleeding point in case of emergency.

The following soothing ointment may be used:

Morphine	grs. v.
Muriate of cocaine	" x.
Calomel	" xl.
Vaseline	1 oz.

Apply locally night and morning.

If there is much itching a dram of menthol may be added to the above (Crockett). In cases where morphine and cocaine are

contraindicated other simple ointments may be used, such as that of hamamelis or boric acid. I think, however, that the official boric-acid ointment and that of Lord Lister are both too hard, either from the addition of wax or from the high melting point of the paraffin, and I prefer one of those recommended by Martindale as follows:

Paraffin (135° F. or 140° F.)	5	parts.
Vaseline	10	"
Boric acid	3	"

Apply night and morning.

DISEASES OF THE RESPIRATORY ORGANS

Certain diseases of the respiratory system during pregnancy cause a considerable amount of discomfort. The dyspnœa which sometimes occurs, when not caused by heart disease, may be reflex or may be due to anæmia. Bromide of soda and codeine sometimes relieve the condition. The rules which have already been given as to the management of the stomach and bowels should be observed, and the patient should also be directed to avoid everything in the shape of excitement or overexertion in order to lessen as much as possible the demands made upon the respiratory organs.

NERVOUS DISEASES

Diseases of the nervous system in a great variety of forms are extremely common during pregnancy. In a general way it may be stated that these disorders, usually functional, rarely organic, are generally caused by the following conditions: Hydræmia, general toxæmia, pressure of the enlarged uterus.

Neuralgias.—Neuralgia may exist in any of the sensory nerves, but is especially common in two situations.

1. In the region supplied by the fifth or trifacial nerve.
2. In the region supplied by the nerves arising in the pelvis.

It is better to treat the various forms of neuralgia by external applications, such as camphor, chloroform, aconite, or menthol liniments. I prefer the menthol liniment made as follows:

℞ Menthol	3	parts.
Chloroform	4	"
Olive oil	9	"

As far as medicine is concerned one should endeavor to treat the hydræmia or general toxæmia on general principles by the administration of good food, tonics, and by proper elimination by cathartics, and perhaps, to some extent, by diaphoretics. In extreme cases it may become necessary to prescribe such sedatives as morphia and chloral, but these should be avoided if possible. If the administration of morphine is considered necessary it is better to give it by hypodermic injection, without letting the patient know what medicine is being used. Never on any account let the patient use the hypodermic needle herself.

Insomnia.—Insomnia is one of the most common and one of the most unfortunate symptoms which can develop during pregnancy, and we can do but little to improve matters apart from general treatment without administering narcotics. When the insomnia has lasted long enough to produce evident nervous exhaustion we must have recourse to some of the hypnotic drugs. The bromides of potassium and sodium are probably most commonly used, with, perhaps, a preference for the bromide of sodium, which is thought to produce less gastric and intestinal irritation. Reynolds thinks that if either bromide is used it should be given in small doses of from 10 to 20 grains, repeated several times during the latter part of the day, as, for instance, at 5, 8, and 10 P.M,. rather than in one dose at bedtime. Trional or sulphonal may be given in 20-grain doses at bedtime. The following mixture is often useful where there is a marked nervous irritability:

℞ Sod. Bromid..... ʒ ij;
Chloral Hydrat..... ʒ ij;
Tinct. Hyoscyami..... ʒ ij;
Aq. ad..... ℥ ij.

A teaspoonful at 9 and 10 P. M.

As a last resort the administration of morphine, in a small proportion of cases, may be necessary.

Exaggerated Mental and Emotional Disturbances.—The mental disturbances which are apt to occur during pregnancy are numerous and varied. They are sometimes slight, sometimes so serious as to result in insanity. Certain traits of an unpleasant character which may develop are frequently the result of a diseased condition, not bad temper. It not unfrequently happens that a

patient usually even-tempered and good-natured, becomes during pregnancy exceedingly irritable, suspicious and disagreeable. Without becoming actually insane, she may develop a desire to avoid those who are near and dear to her. These unfortunate traits are apt to appear about the middle of pregnancy and generally last until pregnancy has terminated. In such cases one should always think of the possibility of the development of insanity. A patient showing these symptoms requires the most constant and watchful care. The surroundings should be of the most cheerful sort and every effort should be made to prevent her from thinking too much of herself and her condition. Sometimes it is well to fully explain matters to her and urge her toward efforts of self-control. It is very often better to have her served by comparative strangers rather than by her most intimate relatives. This is the kind of case where the physician should use all his powers of magnetism in order to acquire her confidence to such an extent that he may perform a sort of faith-cure. The physician and attendants should make it their chief aim to comfort and cheer the patient, and while they may require at times to be dogmatic and firm they should at all times be absolutely kind. The bromides in such cases may be useful to some extent, particularly when insomnia is also present, but otherwise hypnotics will accomplish little good.

Chorea.—Next to eclampsia, among the neuroses of pregnancy, chorea is the most serious. It fortunately is not common. Spiegelberg says that he has seen it only three times in his large practise. Barnes could find only 56 published cases, while others say that 84 cases only have been described. I am rather surprised at such statistics from men of large experience and am inclined to agree with Dakin, who thinks that it occurs more frequently than was formerly supposed. Dakin saw 3 cases in two years, 2 fatal, in St. George's Hospital, and 1 mild in the General Lying-in Hospital. It generally occurs, for the first time, during the first pregnancy and may or may not recur in successive pregnancies. The first symptoms usually appear between the third and fifth months, and not uncommonly at the time of quickening. The choreic movements generally persist until after delivery, when they gradually disappear. The clonic spasms are generally severer than in children and in certain cases soon lead to extreme exhaustion, which may cause death before or after delivery. Death,

when it ensues, may be due to the exhaustion or to complications. The mortality is probably 25 to 30 per cent.

Treatment. The ordinary medicines, or the so-called specifics, generally recommended for chorea appear, as a rule, to produce but little or no benefit during pregnancy. In a large proportion of cases arsenic and iron produce no good results. Probably the best and most efficient remedies, in the way of medicines, are narcotics and sedatives given in large doses with a view of cutting short and diminishing the severity of the attacks and quieting reflex irritability. In severe cases half a grain of morphine, administered subcutaneously, will do much toward controlling the spasms, if it does not cure them. Opium in large doses will often produce a similarly good effect. Among the other medicines which may be recommended are chloroform, chloral, bromide of sodium, and ordinary tonics such as quinine, strychnine, calumba, gentian, etc. Professor Oui prefers chloral. He says that in one serious case the daily dose of a dram of chloral was followed by great improvement in five days, and by complete recovery in twenty-four days. Pinard keeps the patient in a continuous sleep with chloral, awakening her only for food, until the choreic movements are markedly diminished. A patient, under W. P. Caven, suffering from serious chorea of pregnancy was speedily cured (apparently) by the administration of chloral. Berry Hart reports a case of somewhat mild chorea of pregnancy, where antipyrin in grs. xv (1 gm.) doses four times a day administered for seventeen days appeared to cure the patient.

In severe cases the induction of labor or of abortion is clearly indicated, and unfortunately these operations will not always cure. In extreme cases operative interference should not be postponed until too late.

Some years ago a patient afflicted with severe chorea of pregnancy came under my charge in the Toronto General Hospital, having been sent in by Dr. W. R. Walters.

Mrs. K., aged twenty-two. I para. Five months advanced in pregnancy. The patient was extremely ill with clonic spasms much more severe than those generally found in children (as is very apt to be the case in chorea of pregnancy). Acute mania soon supervened. After a consultation it was decided to induce abortion. This operation was performed in as gentle a manner as possible. There was no improvement in the condition, the severe clonic spasms continued, and the patient died from exhaustion in about two days after.

I have seen one case of unilateral chorea in a patient, also under the charge of Dr. W. R. Walters. I saw her when pregnancy was advanced about four months. The movements on one side were peculiar, although supposed to be choreic. We were not certain, however, that there was not an element of hysteria producing some of the erratic movements. This patient was watched carefully, went through pregnancy without any accident, and gave birth to a living child.

PARALYSIS OF PREGNANCY

Various forms of paralysis may complicate pregnancy. Among these the most common are: Hemiplegia, paraplegia, facial paralysis, paralysis of the nerves of special sense.

Hemiplegia.—Hemiplegia may result from cerebral apoplexy, or possibly from thrombosis from cerebral anæmia with hydræmia. In a large proportion of cases it has no very serious effect either on pregnancy or labor apart from the inconvenience which such a condition naturally causes.

Treatment. Administer strychnine and other tonics and employ perhaps faradization of the affected limbs.

Paraplegia may be caused by pressure upon the pelvic nerves by the fœtal head, or it may be traumatic in origin. As a general rule it produces no bad effect either upon pregnancy or labor. Very frequently women so affected suffer much less than other women in parturition. Generally, also, involution of the uterus takes place in the ordinary way, while lactation is in all respects normal.

Facial paralysis is said to occur occasionally in pregnancy. Its cause is not clear, although it is supposed to be due to anæmia and hydræmia.

Paralysis of the nerves of special sense is not uncommon and may result in such conditions as amaurosis or deafness. It is generally understood that amaurosis, either partial or complete, is commonly due to renal disease. It is stated, however, that in certain instances the blindness is entirely due to an anæmic state of the retina, which, as a rule, affects both eyes. Deafness is not so easy to explain, as in many instances the causes can not be discovered or even conjectured.

The paralysis, whatever be its nature or cause, generally disappears after parturition.

Muscular Cramps.—Many women during pregnancy suffer much from frequent attacks of muscular cramps in the thighs and legs. These cramps usually come on at night and often cause much suffering. They are directly due to pressure on certain nerves and can not, therefore, be cured during pregnancy.

Fotheringham thinks that these cramps are more commonly exactly analogous to the cramps occurring in the athlete, after overexertion, or in the leg of one who has had phlebitis say after typhoid or childbirth. The muscle being "waterlogged" by impeded venous return (and the lymphatic return is usually affected at the same time and by the same cause), is irritated by the long retention in it of waste matters, which are specially abundant in the blood during pregnancy, and when the few hours of inactivity in bed have deprived the muscles of the massage given them by their own contractions as the patient moves about, the amount of retained waste matter becomes sufficient to irritate both sensory and motor nerve terminations in the muscles to the point of eliciting cramps. The firm contraction and cramping kneads the muscles and to some extent empties them of their irritant.

The cramps may be ameliorated in many cases by general massage administered just before bedtime, or by rubbing with certain applications, such as camphorated oil and menthol liniment.

DISEASES OF THE SKIN

The following forms deserve special mention, although strictly speaking all sorts of cutaneous diseases may be met with.

Anomalous Pigmentations.—Ordinary pigmentations of the skin, which are normally present in pregnancy, may be greatly exaggerated. In certain instances various portions of the face, but especially the brow, cheeks, and chin, may be uniformly darkened, producing what is called the mask of pregnancy. In other cases various spots of pigmentation occur, such as liver spots and freckles (chloasmata and ephelides). These areas of pigmentation do not extend into the hairy scalp. They are sometimes found on the breasts, thighs, and abdomen. They generally disappear after labor and as a rule require no treatment.

General Pruritus.—This condition is not very uncommon and often produces extreme suffering, occasionally even resulting in abortion or premature labor.

Treatment. The treatment of this form of skin disease is sometimes very unsatisfactory. Simple localized treatment often furnishes great relief and should never be neglected. The best form of such treatment is the employment of alkaline baths, carbonate of soda, bicarbonate of soda, or carbonate of potassium, four to eight ounces in an ordinary bath. The application of sedative lotions, such as camphor water, hamamelis water, or such liniments as menthol, aconite, or belladonna, or solutions of carbolic acid, creolin, or lysol 1 per cent. to 2 per cent., may produce good results. In all cases use laxatives freely, especially if other symptoms of general toxæmia are present. In some cases the bromides or chloral, or both, may be indicated. Antipyrin is often valuable, particularly if there is an urticarial element in the condition. In certain cases, where the symptoms are extremely severe, large doses of opium or morphine may be desirable.

Impetigo Herpetiformis.—This is a very peculiar and serious skin disease, which occasionally complicates pregnancy, and was first described by Hebra. Small pustules appear on the inner side of the thighs and are accompanied by high fever and great prostration. These pustules may also be found in other folds of the body, especially near the umbilicus, in the axillæ, and under the mammæ. They generally spread over the whole body. The groups which first appear soon become dried up in the center, while at the same time they extend peripherally like herpes iris. Along with the high temperature there are chills, gastric disturbance with vomiting, extreme prostration, delirium, followed, in the majority of cases, by coma and death.

Treatment. Give cathartics to a limited extent, stimulants, nourishing food, and employ the same sort of soothing treatment that was recommended for general pruritus.

Herpes Gestationis.—This is a peculiar neurotic affection of the skin, first, I think, described by Bulkley, somewhat similar to impetigo herpetiformis, although much less dangerous. It also begins with clusters of vesicles, generally on the extremities, which spread more or less over the body. The eruption takes the nature of pemphigus and erythema and is described by Dorland as showing on different portions of the body, papules, vesicles, and bullæ.

Treatment is similar to that of impetigo herpetiformis.

Purpura Hæmorrhagica.—This disease occasionally complicates pregnancy and is similar to that form which occurs during the non-

pregnant state. When occurring in pregnancy, however, it is apt to run a very rapid course to a fatal termination. The mother's death is generally due to exhaustion, post-partum hæmorrhage, or sepsis, and is nearly always preceded by premature expulsion of the ovum.

CHAPTER XI

DISEASES OF PREGNANCY (Continued)

PROLAPSE OF THE UTERUS

This condition is not unknown during pregnancy, but when present it is probable that it existed previous to conception. The prolapse may be produced during pregnancy by a shock affecting the whole body, or possibly through a violent action of the abdominal muscles. There is generally associated with it a prolapse of one or both vaginal walls, and it will be more convenient to speak of the condition as prolapse of the uterus and vagina.

The condition is more frequent in multiparæ. The prolapse, which is found early in pregnancy, disappears with the ascent of the uterus, which usually takes place. In exceptional cases there may be a marked procidentia causing a part or the whole of the uterus to be extruded from the vagina, but procidentia uteri is frequently simulated by a marked hypertrophy of the cervix. It is important that such hypertrophy should not be mistaken for prolapsus of the uterus and vagina, because any efforts to lift up such a hypertrophied cervix might lead to evil results. In downward displacements of the uterus and vagina the course of events, according to Spiegelberg, is usually as follows: 1. The prolapse disappears with the increase in size and the rising up of the uterus, at most some descent of the vagina only persisting. 2. Or it may be that the uterus, lying with its cervix wholly or partially outside the vulva, with its body in the pelvic cavity, is by injudicious practise neglected, and allowed to remain down until it has grown so large that it can not pass through the pelvic brim. This is especially apt to occur when retroversion is associated with the prolapse. Under such circumstances incarceration may occur, causing abortion, peritonitis, etc. 3. In rare cases the greater part of a prolapsed uterus may pass entirely out of the pelvis, and unless artificial or spontaneous reposition takes place pregnancy will be prematurely terminated.

The prolapse of the vaginal walls always produces traction upon the bladder and rectum and may offer an impediment to delivery during labor.

Treatment.—Fortunately, in the majority of instances, spontaneous reposition or ascent of the prolapsed uterus will take place about the fourth or fifth month. If it does not, then abortion is to be feared. Rest in the recumbent position should be tried, the bowels kept freely open, and the bladder as nearly empty as possible. When necessary, the prolapsed uterus and vagina should be lifted up and should be retained in position by a medicated tampon of cotton-wool held in position by a perineal bandage. According to Spiegelberg, a fresh tampon should be inserted every morning and removed at night, or if such a procedure is too irksome, a simple gutta-percha ring may be substituted. He prefers the tampon, however, because the ring irritates the vagina and the portio vaginalis. It may be pushed down to such an extent that a perineal bandage is also required. In some cases of incarceration it may be difficult, or impossible, to lift up the uterus. In such cases the patient should be put under an anæsthetic, the bladder emptied, and the uterus lifted up. Sometimes the parts are so swollen that this can not be done at once; under such circumstances the attempt should be renewed at intervals, while superficial scarifications of the lips of the os and warm fomentations may be used to reduce the swelling. In extreme cases it may become necessary to empty the uterus.

ANTEVERSION AND ANTEFLEXION OF THE UTERUS

The increased weight of the uterus, especially in its upper portion, early in pregnancy, is apt to produce some increase in normal anteflexion and anteversion. A certain amount of inconvenience or pain is so common as to be considered one of the early signs of pregnancy. The pressure of the fundus on the bladder and the cervix upon the rectum is apt to produce a certain amount of irritability. Frequent and painful urination and excessive vomiting may occur. These displacements are generally rectified by the ascent of the uterus into the abdominal cavity.

Treatment.—Replace the uterus in its proper position and keep the patient in bed for a time, introducing a pessary if necessary.

In the latter part of pregnancy anteversion and anteflexion

sometimes produce the so-called pendulous abdomen. The anterior wall of the body of the uterus may sink in such a way that its lower portion forms a large pouch hanging down in front of the anterior wall of the pelvis while the cervix is still in the pelvic brim. The chief troubles produced by a pendulous abdomen are irritable bladder, difficult defæcation, pain due to the stretching of the abdominal skin, excoriation where reflexion exists, and œdema of the lower portion of the abdominal walls. The proper treatment for this condition is the application of some form of abdominal bandage during the latter months of pregnancy and also during labor.

RETROFLEXION AND RETROVERSION

Retroversion is perhaps the most frequent and by far the most serious condition which can exist in the gravid uterus, and with retroversion there is generally some retroflexion. The distinction is, in a sense, unimportant from a practical point of view, and I shall generally, in speaking of the condition, use the word retroversion with the understanding that there is also some retroflexion.

In the great majority of cases the displacement existed before conception, but it is sometimes caused by a fall or other accident during pregnancy. This displacement soon becomes aggravated by the gradual enlargement of the uterus. There is generally a partial prolapse which makes matters worse. Early in pregnancy the growing uterus, and especially the fundus, presses upon the surrounding parts. Probably, in the majority of cases, as the uterus enlarges, it rights itself spontaneously and thus rises from the hollow of the sacrum into the abdomen.

Unfortunately, this spontaneous rectification does not always take place; the displacement becomes aggravated and the uterus often becomes more retroverted, causing the cervix to be tilted upward in such a way that it stretches the anterior vaginal wall and urethra and presses upon the bladder wall; at the same time the displaced fundus presses upon the rectum. About the end of the third month, when the uterus has become considerably enlarged, the fundus may be kept under the sacral promontory because the antero-posterior diameter of the pelvic brim is less than that of the pelvic cavity. Thus we have produced that very serious condition which is known as incarceration of the retroverted gravid uterus. While the fundus is retained in the hollow

of the sacrum the cervix is pushed more and more forward and upward until it causes retention of urine.

Symptoms.—These are irritability of the bladder with frequent micturition, occasional retention of urine, a sense of fulness in the pelvis, pains in the sacrum generally passing down the thighs, difficult and painful defæcation, together with more or less aggravation of some or all of the ordinary reflex symptoms associated with pregnancy. In connection with these symptoms a tenesmus sometimes exists, which is almost intolerable, and straining efforts in connection with this tenesmus greatly increase the agony. By

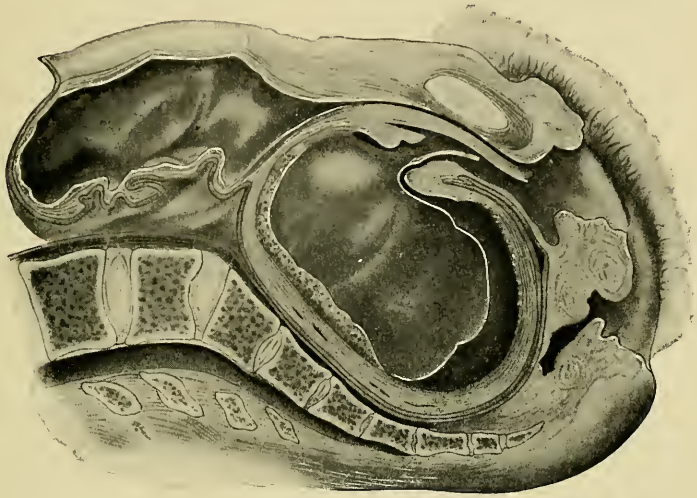


Fig. 112.—Incarceration of Retroflexed Pregnant Uterus (Swytzer).

far the most serious symptoms, however, in the great majority of cases are those connected with the bladder. It may be that the retention of urine, before referred to, is not complete; urine continually dribbles to a certain extent or is partially voided either voluntarily or involuntarily in such a way that the bladder becomes enormously distended even while a certain amount of urine is passed every day. Cystitis, in connection with this condition, may greatly aggravate matters. Fortunately rupture of the bladder is extremely rare, although such an occurrence has been reported. The urine may be dammed back so that it accumulates in the pelvis, or even in the substance of the kidneys, and a septic or uræmic poisoning may be produced not uncommonly causing

death. Peritonitis has also been described as a very rare cause of death.

If the patient is not properly treated, abortion, incarceration of the uterus, sloughing of the bladder from pressure, the formation of a fistula, or other serious results may follow.

Diagnosis.—It is not usually difficult to make a diagnosis of a retroflexed or retroverted gravid uterus, before or after it has become incarcerated. The symptoms mentioned above—namely, a sense of fulness in the pelvis, frequent micturition, pain in defæcation, pain in the sacrum and thighs, and exaggeration of various reflex symptoms—should lead one to suspect a displacement. On making a vaginal examination one can generally detect that the fundus is thrown backward into the hollow of the sacrum and the cervix is pushed forward and upward against the bladder. It is well to remember, however, that the various subjective and objective signs pointing to retroversion may be produced by such causes as ectopic gestation, fibroma of the posterior wall of the uterus, small ovarian tumor, an accumulation of fæcal matter in the rectum, or anything in Douglas's pouch which pushes the uterus forward against the symphysis and causes retention of urine. I was mistaken in the following case:

Mrs. C., aged thirty. IV para. About three months pregnant. Suddenly seized with a very severe pain causing her to fall and become unconscious. Slight uterine hæmorrhage. Mass detected in pelvic cavity. Unable to locate cervix uteri, suspected ectopic gestation with rupture into the broad ligament. Called Dr. J. F. W. Ross in consultation. After careful examination under an anæsthetic Dr. Ross expressed the opinion that there was incarceration of a gravid retroverted uterus. Without going into further detail, I may say that about twenty hours afterward abortion occurred, after which all serious symptoms subsided.

In another case I was for a time much puzzled.

Mrs. S., aged thirty-three. V para. Supposed to be about three months advanced in pregnancy. Suddenly seized with very severe pelvic pains. Found that there had been before much irritability of the bladder and rectum. I at first thought there was retroversion of a gravid uterus which I attempted to reduce. Was unable to do so, and, for a time, thought I detected something which was either a fibroid tumor of the posterior wall of the uterus, or a small ovarian tumor pressing against the uterus and forcing it forward. After getting an assistant to anæs-

thetize the patient, I was able to push the fundus upward and then discovered that I had nothing but a retroversion to deal with. I placed a pad of sheep's wool under the fundus and kept the patient quiet in bed with the hope that no evil results would follow. Two days afterward, however, an abortion occurred.

Treatment.—Empty the rectum by enemata and catheterize the patient, using a soft, flexible male catheter. Remember that the urethra is apt to be much distorted, the meatus generally pulled up behind the base of the bladder and the urethra may be pressed very firmly against the symphysis; the point of the catheter, therefore, should be directed close up behind the symphysis. Even after having passed the catheter into the bladder it is not always easy to withdraw all the urine. First, pass the catheter as far as it will go, then when the urine has ceased to flow draw it gradually forward and repeat if necessary, at the same time making external pressure. In some cases the stream may be obstructed by blood clot, mucus, or detached mucous membrane. Where any such condition is suspected a stream of warm borated water may be injected into the bladder. It may be impossible to pass the catheter into the bladder; under such circumstances aspirate.

After the bladder has been emptied efforts should be made to replace the uterus, chiefly by pushing the body upward. Difficulties may arise from two causes; in the first place adhesions, especially at or near the fundus uteri, may exist, or secondly, the difficulty may arise from the swelling of the parts in the pelvis. Such swelling may gradually, to some extent at least, subside after the bladder is emptied; on this account it is not well to push the attempt at reduction too abruptly. It is often better to keep the woman perfectly quiet in a semiprone position, and, as recommended by Barnes, to give a subcutaneous injection of morphia, empty the bowel by enema and introduce a Barnes's bag into the rectum. In one case in Robert Barnes's hands, at the London Hospital, this plan failed, but in two others at St. George's it completely succeeded. Playfair also has replaced the uterus by this procedure.

If this method fails taxis may be again tried after some hours. Anæsthetize the patient, place her in a semiprone position, pass one or two fingers up the rectum and place the tip or tips of the fingers on the right side of the body of the uterus; then press

steadily, not directly upward but sidewise toward the left ilium, in order to release the uterus from the overarching promontory.

Barnes has found that when the uterus is thus pushed over to the side the fundus finds room in the retreating excavation at the side of the promontory, in consequence of which it will rise forward with little difficulty, sometimes even with a spring. Sometimes, while pressing on the fundus one may use traction on the cervix in the opposite direction with or without vulsellum forceps. If recognized early, such cases have been relieved by rigorously maintaining for a couple of days the semiprone posture on a couch and in bed, the knee-chest posture being adopted for fifteen or twenty minutes every two or three hours, and air admitted to the vagina by retracting or elevating the perinæum with the finger, a procedure of which a nurse of ordinary intelligence is capable.

Induction of Abortion.—When these efforts fail and urgent symptoms persist it may be necessary to induce abortion. This may be done in the old-fashioned way of introducing a sound into the uterus and puncturing the amniotic sac. This at once reduces the volume of the uterus, and taxis tried again after a few hours may be successful. After the uterus is replaced one may complete the abortion by more modern methods. Sometimes, however, the os uteri is so high up that it is not accessible; when such is the case it becomes necessary to tap the uterus through the posterior wall with an aspirator trocar. In doing this the finger of the left hand, applied within the vagina or rectum, feels the most bulging part of the uterus, and the trocar, guided by it, is pushed perpendicularly into the uterus. It may be necessary also, sometimes, to puncture both the bladder and the uterus with the aspirator trocar.

In some cases when the symptoms are not urgent it may be wise not to make any great effort at reduction at once, but keep the patient quiet and the bladder and rectum empty. Efforts at reduction may be renewed at various intervals.

After Treatment.—It is very important, after reduction, to prevent the uterus from falling back again into the faulty position. I know of no better way of preventing this than the introduction of a suitable Hodge pessary. The pessary may be removed in a few weeks when the increased size of the uterus will prevent the fundus from dropping back into the hollow of the sacrum.

INCOMPLETE RETROVERSION OR INCOMPLETE RETROFLEXION

In some cases the backward displacement is only partially rectified, and we have incomplete retroversion or retroflexion. The greater portion of the uterus passes up into the abdomen, but a small portion remains within the pelvis beneath the promontory of the sacrum. In explaining such a condition Spiegelberg says that the anterior wall of the uterus, which is the least affected by the pressure of the neighboring organs, rises into the great pelvis and grows into the abdominal cavity, thus forming a secondary pouch in which the great mass of the fœtus lies while the posterior wall remains in the pelvis. He calls this a retroflexion during the second half of pregnancy and labor, or a sacciform dilatation of the posterior uterine wall. Although, as a rule, the larger abdominal part of the uterus at last draws up the pelvic part with it and thus completes reposition, this may not be the case.

Symptoms of incarceration may show themselves even at a late period where this condition of incomplete retroflexion is present; they may last but a short time or may be followed by premature labor. When parturition occurs in these cases the pelvic cavity is found to be filled by a diverticulum of the posterior uterine wall, and this, as a rule, contains the head. The cervix is pressed firmly against the upper edge of the symphysis and does not move into the pelvic axis, so that the parturient canal does not attain its natural development. The bulging wall is greatly stretched downward and is occasionally broken through. In a few cases when the pains have lasted for some time reposition has occurred spontaneously, even at this stage the os uteri receding from its former position toward its pelvic axis.

Spiegelberg goes on to say that the diagnosis of this condition will not be difficult if a careful bimanual examination is made. Treatment during pregnancy must be mainly expectant, since, apart from frequent dysuria and painful defæcation, there are no symptoms. Gentle attempts at reposition should, however, even then be made at intervals.

It is well, as early as possible during labor and while the woman is in the genupectoral position, to push the pelvic portion of the uterus up with the finger in the rectum, while the abdominal part is firmly pushed forward. The reposition will sometimes be facilitated if, at the same time, the cervix is pulled toward the middle

of the pelvis by the accoucheur or an assistant introducing the fingers into it. Digital dilatation of the os favors the descent of the presenting part and the disappearance of the irregularity.

HERNIA OF THE UTERUS

Hernia of the unimpregnated uterus is exceedingly rare, and it is still more rare for a dislocated uterus to be impregnated, or for a hernia of the organ to take place after conception. It is said, however, that pregnancy is sometimes seen in an inguinal hernia, and also in a simple umbilical hernia, and possibly also in a femoral hernia. The most important condition of this sort, from a practical point of view, is the so-called hernia ventralis, in which the gravid uterus passes forward between two recti muscles which have become separated after abdominal section.

Treatment.—As soon as the condition is discovered the uterus should, if possible, be restored to its normal position and retained by a truss. Some think that if it can not be replaced abortion should at once be induced, because otherwise it will occur spontaneously later under less favorable conditions.

In cases of ventral hernia the organ should be replaced and relapse prevented by an abdominal bandage. I have had two patients who suffered from this so-called ventral hernia. A bandage was kept applied during the later months of pregnancy and during labor. In each case the labor was somewhat tedious but otherwise uneventful.

LEUCORRHŒA

Leucorrhœa, which is so common in pregnancy, is sometimes described as a disease of the vagina. There are at least two distinct forms of leucorrhœa, one of which may be called cervical and the other vaginal.

Cervical leucorrhœa frequently, or perhaps generally, depends on simple catarrh, but it may be due to a deeper-seated inflammation of the cervix. There may be associated with it erosion and perhaps ulceration. In most cases the inflammation of the cervix precedes pregnancy.

Vaginal leucorrhœa is much more common during pregnancy, even although in a large proportion of cases it may not have existed prior to conception. The secretion is frequently very copious,

sometimes thin and milky, sometimes thick and creamy, sometimes purulent, sometimes purulo-sanguineous; the latter two forms—that is, the purulent and semipurulent—are generally due to gonorrhœal infection. The hypertrophy of the papillæ, which is found to a certain extent in all cases of pregnancy, may become very marked. There may be a great development of fungi, forming whitish or yellowish-gray patches on a red ground, especially at the lower portion and at the entrance of the vagina. When very copious the discharge sometimes causes great weakness and debility. In a certain proportion of cases the vaginal walls become greatly hardened by the leucorrhœa, and on account of the diminished elasticity are sometimes torn during labor.

Treatment.—Slight leucorrhœa calls for no special treatment except the ordinary efforts to maintain cleanliness. When the discharge is so profuse as to cause general weakness or pruritus vulvæ, or both, careful treatment is required.

The simplest form of treatment is the frequent bathing of the external genitals with hot water and soap, or some weak antiseptic solution, such as 5 per cent. boric acid or 1 per cent. lysol. If this is not sufficient vaginal douches may be used. The water used should be neither hot nor cold, nor should it exceed, as a rule, half a pint in quantity, and great care should be observed.

If a copious discharge is found, by specular examination, to come from the cervical canal, somewhat strong applications may be necessary. Spiegelberg recommends the single application of an active caustic (the red-hot iron being the best). Others advise the application of nitrate of silver from 10 to 60 grains to the ounce. There are two serious dangers connected with the use of nitrate of silver. In the first place it may be followed by more or less hardening and stenosis; in the second place it may induce pains. It is safer to make an application of a fairly strong solution of lysol or ichthyol. A very good way to make the application is to soak a small tampon of sheep's wool, or absorbent cotton, in a 5 per cent. solution of lysol and sprinkle over it a certain amount of boric acid, tannin, or powdered alum and place it against the external os; or the tampon may be medicated with a 25 per cent. solution of ichthyol in glycerine.

PRURITUS VULVÆ

The intense itching of the vulva, which not infrequently exists in pregnancy, causes much suffering and sometimes even agony. The patient very often, especially in first pregnancies, dislikes to consult her physician about such an ailment. Sometimes the physician is rather indifferent about a matter which he considers somewhat trifling and does not investigate very closely or treat very carefully. It is the duty of the physician to consider it a serious ailment and treat it as carefully as possible.

I have already referred to another form of pruritus of the cutaneous surface, which may be local or general. See pages 207 and 208.

The most common cause of the pruritus vulvæ is leucorrhœa. This is generally understood and sometimes leads the physician to overlook the fact that diabetes is an occasional cause. Another cause is the presence of parasites; generally speaking, the bacteria are intimately associated with, if they are not the cause, of the leucorrhœa. Ascarides in the rectum, in rare cases, produce the condition and the possibility of such a cause should always be kept in mind.

That rare form of pruritus which is confined to the cutaneous surface without any visible alteration of the skin, is probably a pure neurosis. Possibly the pruritus vulvæ may sometimes be neurotic in character, although this is denied by some.

Treatment.—In a large proportion of cases treatment should be simply directed to the cure of the leucorrhœal discharge, which is the cause of the itching.

It must be emphasized that the material used for douches, whether sterile water or medicated water, should be neither hot nor cold, and not more than a half-pint should be used at a time. This rule applies especially to those cases where the patient gives the douche herself. The physician or nurse may use a large amount up to a quart or two quarts, even more if care is taken not to use too much force. In fact, in using the fountain syringe one should simply employ enough force to make the water enter the passage. The reason for this is evident—the possibility that the douche may be forced into the peritoneal cavity. Fotheringham has found a lotion of, say, one level teaspoonful of sugar of lead to a quart of tepid water most useful in such cases.

A simple ointment containing cocaine 1 per cent. or 2 per cent. may also be tried.

If after a time no improvement follows and the physician still attributes the pruritus to the irritating discharge, he should consider that certain organisms are present which should be removed. As it is difficult, or impossible, to remove them altogether by douching, it may be necessary to adopt some procedure which will stretch the vaginal walls sufficiently to properly open out the folds. For this purpose some use bichloride of mercury. I prefer a 5 to 10 per cent. solution of lysol, because it is a good germicide, non-irritating, soapy in character, and does not cause any hardening of the vaginal walls. A fair-sized tampon, soaked in the lysol solution, may be seized with ordinary dressing forceps and pushed along the vaginal tract with or without the speculum. One may introduce a Sims bivalve, or Ferguson's speculum as far as the vault of the vagina, then introduce the medicated tampon and gradually withdraw the speculum while the tampon is retained in position. After this he should hold the labia apart and puff on a powder to the mucous membrane with an insufflator. Herman says the best powders are dermatol (a trade name of gallate of bismuth) and boric acid.

The presence of ascarides in the rectum would of course call for proper treatment. When the pruritus is cutaneous it is usually either general or confined to the abdominal walls. Relief may often be obtained by prolonged bathing in hot solution of bicarbonate of soda, or by keeping the skin constantly covered with a solution of acetate of lead, one dram to the quart, or a solution of carbolic acid, one ounce to a quart, or by inunctions with carbolized vaseline, one dram to two ounces.

PAINFUL MAMMARY GLANDS

Among the most ordinary signs of pregnancy are pain and swelling of the breasts. There is generally some secretion of milk. These conditions are probably simply exaggerations of similar conditions found in women who are not pregnant, especially in connection with menstruation. The increase is chiefly in the glandular tissue, although there may be also some slight increase of the connective tissue and fat. In extreme cases, when there is great increase of the gland tissue, there is found a knotty feeling

and considerable pain radiating from the nipple. The condition is not often sufficiently serious to call for any active treatment. The administration of saline cathartics is, however, generally indicated, and sedative applications, such as solutions of belladonna or ordinary evaporating lotions, may be of service. Sometimes, when the glands are greatly swollen and very tender, the Snively breast-binder, neatly applied, affords great relief. The pain is often of a neuralgic character.

MYOFIBROMATA WITH PREGNANCY

Hoffmeier tells us that fibroid diseases of the uterus have no direct influence in causing sterility. Skene tells us that fibromata of the uterus cause sterility in the great majority of instances. Skene's statement is probably correct. In order to simplify the matter I shall refer to the three ordinary varieties—submucous, interstitial, and subperitoneal.

In the submucous variety of myofibromata pregnancy is exceedingly rare. When it does occur under such circumstances early, or fairly early, abortion probably always occurs. We may, therefore, for practical purposes leave this variety out of the question.

Interstitial myofibromata do not always cause sterility. They are especially dangerous when the tumors are connected wholly, or in part, with the middle layer of the muscular coat of the uterine wall. When large, in this position, they generally prevent the patients from going to full term. The patients either miscarry or die from secondary infections. Under such circumstances a miscarriage is always dangerous. When the patient miscarries, say in the fourth or fifth month, the hæmorrhage is apt to be very profuse; the cervix is frequently slow in dilating. It is sometimes exceedingly difficult to empty the uterus on account of its malposition.

Subperitoneal fibromata are less apt to cause sterility, less apt to cause miscarriage, and less apt to interfere with labor. Particularly is this the case when they are situated in the upper part of the uterus. This is the class of fibroids which is most frequently associated with pregnancy. In a large proportion of cases they do little or no harm.

One of the most important considerations in connection with the presence of such tumors during pregnancy is that of interfer-

ence or non-interference with gestation. As a rule it is not necessary nor advisable to induce abortion. Patients, under such circumstances, should, however, be watched very carefully. One of the chief dangers during the early months is that of incarceration. Such incarceration, if not promptly relieved, becomes dangerous. Replacement of the uterus and keeping it in good position generally give relief and allow the gestation to go on to full term. Apart,

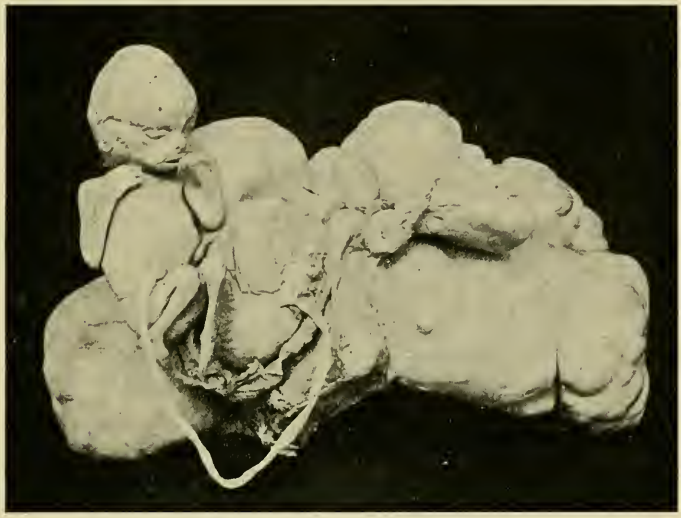


Fig. 113.—Pregnancy with Numerous Myofibromata.

however, from such incarceration the presence of neoplasms may aggravate the reflex disturbances of early pregnancy.

The labor is apt to be more tedious although it frequently ends normally. Forceps are frequently required. Post-partum hæmorrhage is perhaps more likely to occur than under normal circumstances. So far as my experience goes, however, the danger of such an occurrence has been greatly exaggerated by many writers. In a large proportion of cases there is no special tendency toward hæmorrhage after labor.

Fibroid tumors generally grow to some extent during pregnancy on account of the increased blood supply to the uterus. Occasionally a tumor of this sort may thus cause severe pain.

Treatment.—I have been somewhat surprised to find that in the great majority of cases of pregnancy occurring in connec-

tion with myofibromata of the uterus no interference is necessary. It fortunately happens that the uterus looks after itself fairly well.

A patient, referred to me not long ago by Drs. W. P. Caven and G. Boyd, caused us for a time considerable anxiety. Aged thirty. Supposed

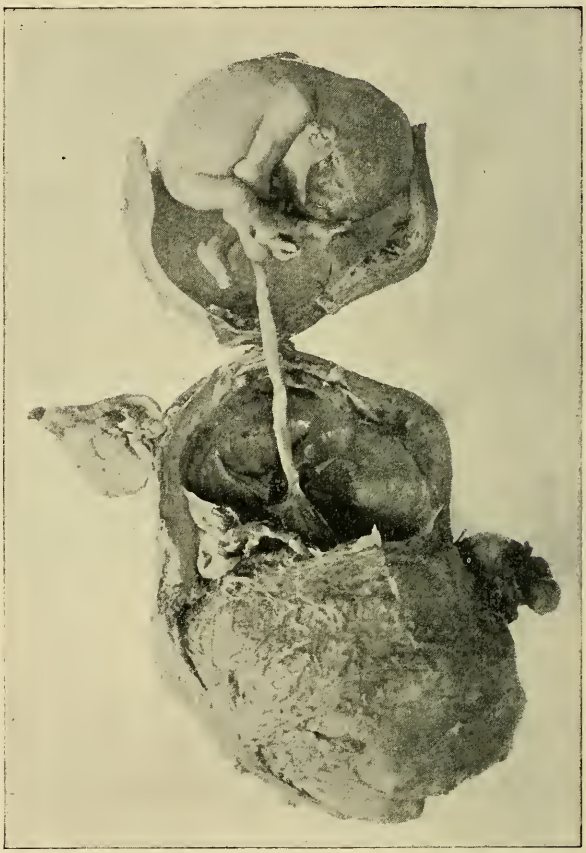


Fig. 114.—Pregnancy with obstructing Fibroids.
(Tor. Univ. Museum.)

to be three months advanced in pregnancy (this supposition was correct). On examination the uterus was found enlarged, fundus being two inches above the pubes, very hard, irregular in shape, enlarged especially on the left side. This enlargement thought not to be a separate ectopic sac. Diagnosis, myofibromata present, especially in the front and left side of

the uterus. We decided not to interfere. Patient went on to full term; labor normal; healthy child born.

Another patient, aged forty, was treated by Dr. James F. W. Ross. Uterus enlarged for some time, the enlargement being due to the presence of fibroid tumors. Hysterectomy contemplated but no operation performed. She became pregnant for the first time after being married twenty years. Dr. Ross, after watching the patient for some months, decided not to interfere and placed her under my care. The labor was somewhat tedious but otherwise uneventful, except that forceps were required to complete delivery. A healthy child born.

During the last twenty-five years there have been only two patients in the Burnside Lying-in Hospital in whom the presence of fibroids caused any special anxiety during pregnancy or labor.

Patient, aged thirty, seen by Dr. Algeron Temple, in the ninth month of pregnancy. He found a large tumor completely filling the pelvis. Under chloroform was unable to pass the finger beyond the tumor so as to reach the os, nor could he push the tumor upward out of the way. Sent her into the Burnside and made arrangements to perform Cæsarean section during labor. Saw her shortly after labor commenced and found the tumor had moved a little. He waited and watched. The tumor gradually moved to the right and upward and passed out of reach. The child's head then became engaged in the pelvis, labor continued until delivery was completed with the forceps. During the puerperium he found a tumor larger than a fist attached to the right side of the uterus close to the cervix. Patient made a good recovery.

In the other case the myoma occupied part of the pelvis and the child could not be dragged through the pelvis. The child was dead and craniotomy and evisceration were performed. Myomectomy, Cæsarean section, Porro's operation, hysterectomy, or embryotomy may be necessary when the myoma or myomata are so large and so situated as to obstruct and prevent delivery.

In case of miscarriage one should empty the uterus as quickly and as thoroughly as possible. This is sometimes a very difficult matter, sometimes impossible by the ordinary methods. In cases of severe hæmorrhage, plugging the uterine cavity with iodoform gauze is the most effectual plan of treatment.

DISEASES OF THE DECIDUA AND OVUM

Chronic Inflammation of the Endometrium.—As a result of chronic decidual endometritis we have thickening of the endome-

trium. The decidua becomes sclerotic, the interglandular cellular tissues become fibrous, and the glands are more or less atrophied.

Chronic Decidual Endometritis with Polypoid Excrescences.—This variety of decidual inflammation is similar in nature to the last described; but we have, in addition to the irregular thickening, tuberosities, and sometimes polypoid excrescences, attached to the free surface.

Catarrhal Decidual Endometritis or Hydrorrhœa Gravidarum.—This is a subject of more practical importance than the forms of endometritis already mentioned. The causes of this peculiar condition are really not known, but generally speaking it is easily recognized clinically. A thin, watery fluid, resembling liquor amnii, but occasionally containing blood, is discharged. The fluid comes from the space between the decidua vera and reflexa. In some cases the fluid runs away steadily; generally, however, there is some obstruction to the flow which causes the fluid to be retained for a time and discharged at intervals in gushes. It sometimes begins early in pregnancy, but is generally more abundant in the later months.

This flow of clear fluid is sometimes mistaken for escape of the liquor amnii or of a fluid which is thought by some to collect occasionally between the amnion and the chorion.

PATHOLOGY OF CHORION

HYDATIDIFORM MOLE OR VESICULAR MOLE

In this peculiar disease the cysts which are formed are filled with fluid containing mucin and albumin. These hydatidiform vesicles are not true hydatids. True hydatids may occur in the uterus, but such an occurrence must be exceedingly rare. The degeneration generally commences before the placenta is formed. In such a case the whole chorion is involved. Sometimes, however, the degeneration commences after the placenta is formed; in that case the villi of the placental portion only are involved, the other villi having become atrophied. Under such circumstances the fœtus generally dies; but it is possible to have only a few lobes of the placenta involved in the degenerative process and a healthy fœtus may be found with a hydatidiform mole. More frequently, however, we find a twin fœtus associated with a vesicular mole.

The diseased villi sometimes pass into the uterine wall, acting like the normal villi to a certain extent by dipping into the uterine sinuses, but they sometimes pass more deeply into the uterine wall than the normal villi and may reach the peritoneal surface; under such circumstances the uterine wall becomes greatly weakened or replaced by a diseased mass.

Fig. 115.—Hydatidiform Mole. (Tor. Univ. Museum.)

The uterus grows very rapidly in the majority of cases and generally becomes as large during the third month as the uterus at the fifth or sixth month of pregnancy, and occasionally as large as the uterus at full term. The causes are unknown. It is supposed by some that the death of the fœtus causes the extra nutrition to go to the chorion. There is probably in all cases some fault of development in the fœtal portion of the ovum, but what it is we do not know. As the new growth comes entirely from the chorionic villi this form of mole is always a product of conception. This is sometimes a matter of very great importance, involving, as it does in certain cases, evidence against the moral character of women not legitimately exposed to conception. The passage of such a mole, however, does not necessarily imply a recent conception, because the diseased mass may be retained for some time within the uterus.

Symptoms.—The first symptom generally observed is the discharge of watery or bloody fluid, the latter of which is sometimes said to resemble currant juice. Another common symptom is

rapid enlargement of the uterus, occurring especially in the third or fourth month. In conjunction with these two signs we frequently find portions of cysts—that is, clusters of the vesicles—coming away with the discharge. In this case the latter is compared to white currants floating in red currant juice. The bloody discharge may be very profuse, greatly exhausting the patient and sometimes leading to a fatal result. The only absolute sign among those given is the discovery of vesicles in the discharged fluid, but other signs are mentioned, such as absence of ballottement, absence of fœtal pulse, unusual hardness of the uterus, with a doughy or boggy feeling and irregular surface.

Treatment.—It is not always necessary to make a positive diagnosis before commencing treatment. In a certain number of cases the uterine hæmorrhage is so copious that it becomes necessary to empty the uterus as soon as possible—that is to say, we have to treat the patient as if she were suffering from inevitable abortion.

The following rules for treatment are recommended:

Empty uterus, dilating cervix if necessary.

Scrape out uterine cavity with finger-tip or curette.

Wash out uterus.

Give ergot after uterus is emptied.

Keep patient longer in bed than after ordinary abortions.

Watch uterus carefully during involution.

On account of the weakened condition of the uterine walls it is necessary to use the utmost care in curetting, whether one employs the finger-tip or curette. Generally it is safer to use the finger-tip gently. It is very important, however, to get every portion of the growth removed, and one should therefore reach every portion of the uterine cavity. It is also well to remember that the process of involution, under such circumstances, is often much more tedious than after abortion or premature labor. The uterus, therefore, should be watched very carefully and the patient should be kept at rest on her back for a comparatively long time.

DISEASES OF THE AMNION

HYDRAMNION, HYDRAMNIOS, OR POLYHYDRAMNIOS

This is a condition in which there is a marked increase of the liquor amnii and the results which follow are probably due simply

to the mechanical action of the excessive amount of fluid. The disease is probably a disorder of the fœtus, but beyond that we know little or nothing as to its origin. A practical point in this connection is the fact that malformed fœtuses are frequently found in connection with hydramnion, the conditions most common being hydrocephalus, meningocele, spina bifida, and talipes.

Symptoms.—The chief symptom is great increase in the size of the uterus. This is not generally noticed until the fifth month. After this the uterus sometimes increases very rapidly in size. It becomes more rounded than normal and tends to fall forward, thus causing a certain amount of separation of the recti, resulting in the so-called pendulous belly. Pronounced dyspnœa is sometimes present. Pressure upward may limit the capacity of the stomach and cause frequent vomiting, while interference with the circulation causes considerable œdema and congestion of the lower pelvic viscera. Sometimes these symptoms grow more and more serious until the uterus empties itself, which it is apt to do prematurely. As far as the child is concerned the most common effect is that connected with its position, or lie, the malpresentations being exceedingly common. It is said that rupture of the uterus sometimes happens, but I have no immediate knowledge of any case of the sort.

In making a differential diagnosis from the conditions already mentioned we have to consider the abnormal enlargement, together with the shape and consistence of the uterus. If we can feel the movements of the fœtal parts and can hear the fœtal heart we should always consider the possibility of pregnancy with some form of tumor. For instance, pregnancy existing with an ovarian cyst may be difficult of recognition, but if we find uterine contractions of one side of the abdomen, or in one part of the enlargement, while there are none on the other side or in other parts, the true condition may become evident.

Prognosis.—The prognosis for the mother is generally favorable, although there is a certain risk of post-partum hæmorrhage. The prognosis for the child, on the other hand, is quite unfavorable, the mortality being fully 25 per cent. The high mortality arises from the following causes: Malformation of the fœtus, malpresentations, dropsical affections, and prematurity. It is wise, as a rule, to warn the friends as to the dangers to the fœtus.

Treatment.—We know of no medicine which has the slightest effect in preventing the accumulation of the fluid. Diuretics, as

recommended by some, are worse than useless. Abstention from the ingestion of liquids, as sometimes practised, is apt to cause in certain cases almost cruel discomfort and produces no good effect. The patient should always wear a well-fitting abdominal supporter and should avoid active physical exertion. One should watch the patient carefully and allow her to go to full term if possible. When, however, the mother's health becomes seriously impaired, especially through grave disturbances of the heart, the induction of premature labor becomes advisable or absolutely necessary.

In labor the membranes should be ruptured, using an ordinary silver probe or some hard instrument if necessary. It is better to have a fair amount of dilatation of the cervix before rupture of the membranes. Frequently the membranes rupture before or soon after the commencement of labor. The result of this is dry labor, which is apt to be very painful and tedious (see pages 377 to 382).

Most obstetricians prefer to puncture the membranes in the interval of the pains in order that the waters may escape gradually, to avoid the danger of a sudden gush, causing malposition of the child. At the Rotunda the practise is to wait until the os is as far dilated as is considered safe, then introduce the hand into the vagina and pass two fingers between the membranes and the uterine wall, then slip a knitting needle or something of the sort along the fingers and puncture the membranes as high up as possible.

My general plan of treatment may be described as follows: Give chloral hydrate during the first few hours, especially when the patient is suffering much pain and the cervix is undilated. If the patient gets a certain amount of rest, and the cervix becomes partially or wholly dilated, much good has been accomplished. I use chloroform a little earlier and more freely than under ordinary circumstances. After a time the patient is anæsthetized nearly, or quite, to the surgical degree, the hand is carefully introduced into the vagina, the cervix is fully dilated, if necessary the membranes are punctured and the hand is passed into the uterine cavity; the wrist or arm then acts as a plug, while the hand corrects the malpresentation, if any exists. The most common malpresentation which I have seen is that of the shoulder, but if one acts promptly turning is generally easy. The following history will illustrate my meaning:

A. B., aged thirty. IV para. Had always been healthy. Hydramnios first noticed in sixth month; was well marked in the last month. Went

on, however, to full term; punctured the membranes; waters came away more rapidly than I wished. By external palpation found malposition of the child, uncertain as to its nature. Introduced hand and found a singular presentation, practically a shoulder with the head extended. Tried first to convert it to a vertex, but only succeeded in making it an unsatisfactory kind of face presentation. Unable to flex the head and consequently decided to turn. This was accomplished very easily. Unfortunately, the child was still-born.

About four years after, the same patient again became pregnant and hydramnios also developed. Labor pains commenced at midnight; saw her at 6 A. M. Was suffering much from pains which were very unsatisfactory in their results. Gave chloral, 15 grs., every twenty minutes for three doses. Pains less during the forenoon and she had some sleep. 4:30 P. M., chloroform to the surgical degree by an assistant; hand introduced into the vagina. Os nearly dilated. Completed dilatation, punctured the membranes, prevented escape of waters with the forearm acting as a plug. Head not engaged but floating loosely. Tried to engage the head in brim but had considerable difficulty. The occiput and back of the child directed toward the right posterior. By internal and external manipulation moved occiput and back anteriorly. Still had difficulty. Flexed the head well and pushed it down into the brim, but it would not remain fixed because I did not let sufficient water escape. While I was allowing it to escape I had great difficulty in preventing the occiput from slipping to the rear. Finally, I was able to put on the forceps with the occiput to the right front and delivered a healthy child.

Oligo-hydramnios is the name given to the condition in which the amount of amniotic fluid is abnormally small. The condition may continue throughout pregnancy, but it is only of importance in the early stages of fœtal development. The amnion may become adherent to the fœtus, and a band thus formed may encircle the fœtal limbs, causing intra-uterine amputation and various other deformities.

CHAPTER XII

INTERCURRENT DISEASES OF PREGNANCY

The Acute Infectious Diseases.—It was at one time thought that pregnancy and the puerperal state prevented a woman from contracting certain diseases. There is probably no foundation for any such belief. The acute infectious diseases of pregnancy affect very seriously both fœtus and mother. In a large proportion of cases they cause the death of the fœtus. The question naturally arises, Is the death of the fœtus caused by the poison or by the high temperature in the mother? By both; but the high temperature is probably the more serious factor. A temperature in the mother of 104°, or higher, is exceedingly dangerous to the fœtus, though cases have occurred in which the maternal temperature reached 105° without causing the death of the fœtus. The mother may have a moderate increase of temperature, say, 100° to 103°, for some time, without seriously injuring the fœtus, but when she has a temperature of 104° for any length of time the fœtus is likely to die. The acute infectious diseases sometimes set up a hæmorrhagic endometritis which destroys the decidua and thus indirectly causes the death of the fœtus.

TYPHOID OR ENTERIC FEVER

Among the various forms of continued fever typhoid or enteric is that which most frequently attacks the pregnant woman. It may do so at any period of pregnancy, but is more apt to do so during the early months. The first symptoms of typhoid fever may appear during or shortly after labor. Under such circumstances it was formerly extremely difficult to make a differential diagnosis between typhoid fever and septicæmia, and the tendency of some practitioners was to give the name typhoid fever to the condition in cases where septicæmia was much more likely to give rise to the symptoms present. We should not go to the other

extreme, however, and forget that fever following abortion or labor may be typhoid.

A short time ago I saw with Dr. Alexander a case of fever following abortion. We thought it was due to septicæmia. Dr. McPhedran, who also saw her, thought it might be typhoid. A marked Widal reaction and a blood test showing leucopenia proved that he was probably right.

In 1887, E. C. admitted to the Burnside while in labor. Child stillborn. Temperature shortly after labor 106°. Severe post-partum hæmorrhage. Death occurred on the following day. Post-mortem examination by Dr. W. H. B. Aikens. No streptococci found, but typhoid bacilli were found in the spleen and Peyer's patches were ulcerated.

Dr. W. P. Caven had two cases of typhoid fever in the sixth month of pregnancy. In one the temperature reached 105° on three successive days, but, apart from these, was never above 103°. Recovery. Living child born three months after. In the other case patient had mild fever, highest temperature being 103°. Recovery. Living child born at full term.

Dr. N. A. Powell's patient, pregnant six months. High temperature for ten days, highest being 105°. Aborted on the seventeenth day. Child lived a few minutes. Mother had a good recovery. He had three other patients with typhoid during pregnancy; one in the seventh month aborted at the end of the third week; one in the sixth month aborted at the end of the third week; one in the third month aborted at the end of the second week. The three mothers recovered.

The reports of other physicians in Toronto are pretty much of the same character. Abortion occurred in the majority of the cases, but the mothers generally made good recoveries. In a large proportion of mild cases the typhoid fever had apparently no effect on mother or fœtus.

Statistics from various parts of the world show that abortion occurs in from 60 to 65 per cent. of the cases of typhoid fever in pregnancy. The results to the mother appear to vary very greatly in different localities, and depend, evidently, to a large extent on the malignity or benignity of the disease. In Toronto most of the epidemics of typhoid fever have been of a fairly mild character.

Treatment.—There are no specific drugs which are known to have any direct effect in the cure of typhoid fever. It is well to remember in connection with treatment that a new poison is added to the mother's system in addition to the greater or less degree of

general toxæmia which is apt to be present. On this account I think it well to pursue the treatment recommended for toxæmia of pregnancy. I prefer calomel with mild salines during the first ten days. Other drugs which may be used are salol, β-naphthol, bismuth salicylate, and creosote. Otherwise one should treat symptoms as they arise, but especially the high temperature. One should try to prevent the temperature from reaching any degree higher than 103°. The best method of doing this is by hydrotherapy, according to the method recommended by Brand, or some modification of it. Personally, I prefer cold sponging to the cold bath.

SCARLATINA

The period of incubation of scarlet fever may be greatly prolonged. As Olshausen tells us, a pregnant woman may become infected and the poison is likely to remain latent until the completion of labor. It appears as if the condition of pregnancy were antagonistic to the evolution of scarlet fever. The woman may have been infected weeks, and possibly months, before labor without showing the ordinary symptoms. The puerperal state, it is said, invites, intensifies, and accelerates the evolution of scarlet fever.

There has been considerable confusion respecting the association of scarlatina with other conditions, such as septicæmia, in the puerperal state. We may have scarlatina alone, or scarlatina associated with septic infection, or septicæmia with the so-called scarlatiniform rash, but no scarlet fever.

Most observers accept Olshausen's statement that four-fifths of all puerperæ attacked will show symptoms within the first three days after labor. The throat complications are generally slight; the eruption passes very rapidly over the whole body and may have a dark red color instead of the ordinary bright scarlet. There is generally complete suppression of the secretion of milk and also of lochial discharges when the scarlatina comes on soon after labor. There is generally a slight tenderness over the uterus for a time and pelvic inflammations very frequently appear.

Formerly, the mortality was said to be very high, from 40 to 60 per cent. It is probable, however, that in a large proportion of the reported cases the patients were suffering from puerperal infection with a septic erythema and not from scarlatina.

A patient exposed to scarlatina during labor or in the puerperal state may contract the specific disease, scarlet fever, but she does not contract septicæmia from this particular form of exposure. If she has a combination of septic infection with scarlet fever the former is due purely to the introduction of certain germs, especially certain cocci, from without.

ERYSIPELAS

Erysipelas may occur at any time during pregnancy, labor, or the puerperal state, and should always be considered a very serious complication. Much has been written in the past about the similarity between erysipelas and septic infection both from a bacteriological and clinical standpoint. I prefer to consider erysipelas from a clinical standpoint. Practically, I think one may consider that erysipelas and sepsis, as we usually find it in the puerperal state, are separate and distinct diseases. A woman may pass through labor while suffering from erysipelas without any evil results excepting those directly due to the erysipelas. Erysipelas of the genital tract, however, is much more serious than erysipelas of the extremities or of the face.

The symptoms of the disease during pregnancy are similar to those found in the non-pregnant woman. The following reports illustrate fairly well the various results that may follow:

Dr. Smith's patient. Six months pregnant. Injured her knee. Erysipelas developed in the thigh eight days afterwards and was followed by a large abscess burrowing beneath the muscles. Premature labor occurred at seven and one-half months. The puerperal period was normal and the child survived.

Dr. J. Ford's patient. Seventh pregnancy. Erysipelas developed about full term. Healthy child born two days after. Lochial discharge and lacteal secretions not interfered with. Disease lasted five days after labor. Puerperal convalescence after this normal. Child did well although it nursed from the breast.

The following case was reported in the British Medical Journal. I have no note of the author's name:

Patient, aged thirty; in the eighth month of pregnancy developed erysipelas. Healthy child born three days after. Was fed from the bottle twenty-one days. A breast-reliever was used to keep up the milk secretion. Child put to the breast after twenty-one days. Highest temperature, 103°; highest pulse rate, 140. Good recovery.

In speaking of this case the author asks, "How long after the disappearance of erysipelas is the breast milk likely to be impure?" This question I can not answer, but I should suppose that it is quite safe to allow the child to nurse from the breast as soon as the ordinary symptoms of erysipelas disappear. In Dr. Ford's case the child had no nourishment excepting that derived from the mother's breast, even while erysipelas was present. Careful examination of the milk generally shows that it contains some pathogenic germs, and yet the child in a large proportion of cases thrives even on such milk.

FIG. 116.—BABE DIED IN UTERO FROM SMALLPOX. (Tor. Univ. Museum.)

MEASLES

The symptoms of measles occurring during pregnancy are similar to those ordinarily observed. Bronchitis is a serious complication. Incessant cough, with accompanying movements of the abdominal walls, frequently induces abortion. The infection may be transferred from mother to child.

SMALLPOX

Smallpox is a serious complication of pregnancy and very frequently causes the death of the fœtus. It is supposed by some that pregnancy renders the mother especially liable to infection of smallpox. There is nothing special to say about symptoms or treatment excepting that vaccination during pregnancy should be performed invariably whenever smallpox is prevalent. Such vaccination is important both in the interests of the mother and fœtus.

PNEUMONIA

Pneumonia during pregnancy is certainly a very serious complication for both mother and child. There is nothing special as to symptomatology. It is probable, however, that heart failure is more apt to develop in the pregnant than in the non-pregnant woman.

Mann reports a case of a woman, aged forty-two, with typical pneumonia at eighth month of pregnancy. The fœtal heart sounds ceased five days after the initial chill. Shortly after the crisis of the pneumonia the child was delivered with the aid of the forceps. Child dead. Mother made good recovery.

Davis reports a case of a young primi-gravida, aged twenty, who developed pneumonia when near the end of gestation. A temperature of 103° F. rapidly developed and an acute pneumonic process, catarrhal in nature, was found over both lungs. Although the os was partly dilated no labor pains were present. The patient's distress and dyspnœa increased and three days after the beginning of the pneumonia the child was expelled with three or four severe labor pains. The child was cyanosed, had fever, and after passing through an attack of pneumonia, recovered. Although the mother's urgent symptoms were relieved temporarily by her labor, she died from heart failure soon afterward.

Treatment of pneumonia complicating pregnancy is similar to that in the non-pregnant woman. The patient is not improved by the induction of abortion. Cupping gives considerable relief in certain cases, as also does the hypodermic use of strychnine and atropine. The prognosis is bad, the maternal mortality being nearly 50 per cent., while the fœtal mortality is probably over 50 per cent.

CHOLERA

I have had no experience with cholera in pregnancy. The following facts are taken from the annual report of the Hamburg State Infirmary by Schultz:

The mortality of the mother and the tendency to abortion are greater the later in pregnancy the patient is attacked. Next to smallpox no disease so surely provokes interruption of pregnancy. It is very deadly to the fœtus at any stage. Labor is usually protracted on account of weak pains; flooding is not frequent; septic infection is somewhat common. Out of 115 pregnant cholera patients the mortality was 44 per cent.

TETANUS

Tetanus is more apt to occur during the early than during the late months of pregnancy. It may develop after any minor operation during the first half of pregnancy, but especially where abortion has required manual or instrumental deliverances. It is more common in hot than in temperate climates, and in the dark-skinned than in the Caucasian races. It may also develop during the puerperal period, but such an occurrence is exceedingly rare.

The proper treatment is prophylactic. One should, therefore, remember that pregnant patients are peculiarly susceptible, and be exceedingly careful in his antiseptic methods when performing any operation or examination.

TETANY

Tetany is somewhat common in pregnancy and lactation in some countries. It is characterized by tonic spasm, beginning in the muscles of the extremities, especially those of the hands. Such spasms may frequently recur for brief periods. They are painful in character and not accompanied by loss of consciousness. The spasms may be local or may involve many different regions of the body. In the slighter attacks a numbness and tingling may be felt in the fingers and toes, which soon become fixed in the tonic spasm. The spasms may extend to higher parts of the limbs and become very painful.

The diagnosis is based on the progressive character of the attacks, which begin in the upper and lower extremities, and after a time intermit, and upon the absence of loss of consciousness.

The prognosis is usually favorable, the complaint gradually subsiding after a few months.

Davis, in contrasting tetanus with tetany in the pregnant woman, emphasizes the following points: In tetanus the spasm begins in face or neck and advances centrifugally with opisthotonos. In tetany the spasm begins in the extremity and advances centripetally. In tetanus the spasm is constant; in tetany it is intermittent.

INFLUENZA

Influenza is not uncommon during pregnancy and the puerperium. In the three serious epidemics that we have had in

Toronto since 1890 the influenza showed no respect for either of these conditions. In the Burnside a large proportion of the inmates were attacked during two epidemics. The results were favorable and the mortality was *nil*. These good results were, I think, due to the fact that the patients were properly treated. Waiting patients were put to bed and kept quiet. Those attacked during the puerperium were also kept quiet in bed until all danger was past. We were able to avoid the two great dangers which caused the serious results outside, viz., *fighting* the disease a day or two too long before going to bed, and getting out of bed and going to work a day or two too soon. Some obstetricians have noted more serious results with abortion or premature labor in a large proportion of cases. In many cases the interruption of pregnancy was preceded by profuse hæmorrhage. The effects of the influenza vary to some extent, of course, with the severity and character of the epidemic.

MALARIA

Malaria is one of the most serious of the intercurrent diseases of pregnancy and the puerperium in some parts of Canada, although not so common now as it was twenty to thirty years ago. Shortly after labor women appear to have an increased liability to this disease, which is apt to appear about the third or fourth day after delivery. The important point as to diagnosis is to decide between malaria and septicæmia.

Treatment.—If the patient has previously had malaria before or during pregnancy a high temperature and rapid pulse during the puerperium are likely to be due to a recurrence of the disease resulting from the traumatism of labor. One should, however, under such circumstances, carry out the ordinary treatment for septicæmia and give in addition 20 to 30 grains of quinine a day. Some think that the quinine accomplishes almost as much for septicæmia as it does for malaria in certain cases.

RHEUMATISM

Rheumatism is not uncommon during both pregnancy and the puerperium. Its occurrence after labor is of more importance, because it may then be, and perhaps generally is, due to septicæmia.

BRONCHOCELE

Bronchocele may appear for the first time during pregnancy, or one that existed before may enlarge during pregnancy. Straining during labor may cause temporary increase of the swelling of the thyroid, but such enlargement usually subsides, at least to a large extent, after delivery.

HÆMORRHAGES

Women who have hæmophilia or are liable to hæmorrhages from any cause generally have such liability increased during pregnancy, labor, and the puerperium. Among the hæmorrhages which are apt to occur during pregnancy are hæmoptysis, epistaxis, bleeding from stomach and rectum, and cerebral hæmorrhage.

LEAD POISONING

Lead poisoning is quite common during pregnancy of women engaged in certain industrial occupations. It induces abortion in many cases by causing the death of the fœtus. Much may be learned from a book on "Dangerous Trades," edited by Dr. Oliver, of Newcastle-upon-Tyne, regarding the dangers to which pregnant and nursing women are exposed while working in factories. He tells us, when speaking of the employment of women in lead works, that the lead exercises an injurious influence upon the reproductive functions, especially of pregnant women. When a white-lead worker becomes pregnant she generally aborts if she continues to follow her employment. If, as occasionally happens, she goes to term the child is generally born dead or dies shortly after birth from convulsions. Among many reports he gives one of a woman who, after giving birth to four children at full term, went into the lead works for six years. During this time she had nine miscarriages in succession and no living child.

MERCURIAL POISONING

Mercurial poisoning is apt to occur in women engaged in such industries as the manufacture of barometers, thermometers, electrical meters, incandescent electric lamps, water gilding, etc. The

symptoms are stomatitis and salivation, destruction of teeth, muscular weakness, tremors, impairment of speech, physical disturbances, and dysmenorrhœa. Miscarriage is frequent and the offspring is liable to be the subject of rickets or scrofula.

TOBACCO POISONING

It has been stated by some that pregnant women who are tobacco workers are apt to abort. It is stated by others that they sometimes suffer from loss of vision. Oliver thinks such statements have not been clearly proven, and expresses the opinion that healthy women working in well-built and well-ventilated factories do not suffer materially from tobacco working. He occasionally meets, however, in the Newcastle Dispensary, female tobacco spinners who suffer from persistent headache, nausea, anæmia, and muscular feebleness; but he has not observed that miscarriage is more frequent in them than in women engaged in other occupations.

FACTORY EMPLOYMENT, PREGNANCY, AND CHILD-BIRTH

One can not say definitely to what extent house or factory work is dangerous for pregnant women. A healthy woman can generally do her ordinary work up to the time of the onset of labor without incurring any serious risk. One can speak, however, with considerable precision as to women after child-birth. They should not engage in house or factory work for four, five, or six weeks after labor. There are definite laws regarding such things in most of European countries, as we learn from one of the articles by Miss A. M. Anderson, Principal Lady Inspector of Factories in England, in Dr. Oliver's book referred to above.

Belgium.—"Women must not be employed in industry within four weeks after child-birth."

Switzerland.—"A total absence from employment in factories of women during eight weeks before and after child-birth must be observed, and on their return to work proof must be tendered of an absence since birth of the child of at least six weeks."

Spain prohibits employment of women within three weeks of child-birth, but also compels employers to allow one hour at least in the ordinary period of employment (for which there must be no reduction in wages) to nursing mothers to nurse their infants. This

hour may be divided into two separate absences, which may be chosen by the mother.

We have in Ontario a male and a female Inspector of Factories. A good many married women are employed in industrial occupations in Ontario, chiefly among the ragpickers. Their ages vary from twenty to eighty years, and a number of the younger women can not come to work in the morning until their children have been sent off to school. Their employers allow them to make up time later, but not to exceed a total of sixty hours per week.

Miss Carlyle, Female Government Inspector of Shops and Factories, is of the opinion that there are few nursing mothers among industrial workers and that most nursing mothers who are compelled to work seek employment chiefly in households as washerwomen and not in shops or factories. There are no special regulations *re* the employment of married women in the Province of Ontario.

APPENDICITIS DURING PREGNANCY

Appendicitis occurs somewhat commonly during pregnancy. Osler considers that appendicitis, as a rule, is a disease of young persons and quotes Fitz's statistics, showing the relative frequency of appendicitis in patients of all ages and conditions. The figures show that more than 50 per cent. occur before the twentieth year, 60 per cent. between the sixteenth and thirtieth years. The disease is also very much more common in males than females—90 per cent., according to Fitz. From these statistics we should infer that only a small proportion of women over thirty are attacked in any case. We should, therefore, not expect to see a large number of cases of appendicitis during pregnancy. I am not sure whether women during pregnancy are more subject to attack than under ordinary circumstances, but they are at least equally liable. I rather agree with Marx, who says there is reason to think that the congestion of the system and the vicious condition of the blood associated with pregnancy act as a predisposing cause of appendicitis.

Varieties.—I shall accept Osler's statement that, for practical purposes, we should recognize a catarrhal and ulcerative appendicitis, at the same time bearing in mind, however, the fact that with the ulcerative form we may have perforation or gangrene, or both. Beyond this I shall refer only to diagnosis and treatment.

Diagnosis.—The question of diagnosis is, of course, exceedingly important. Obstetricians have, I fear, been somewhat slow in recognizing or appreciating this fact. Many cases, if not the majority, even during the last ten years, have been almost certainly overlooked, but there has been a great improvement in this respect during the last five years.

Pinard considers that an early diagnosis is usually possible. He adds that all abdominal pain during pregnancy should be carefully investigated. If the pain is not due to uterine contractions, pointing to threatening abortion or labor, the possibility of appendicitis should always be considered. It is well to remember, perhaps, in this connection, that tenderness is more important diagnostic evidence than pain. The vomiting of appendicitis is entirely different from that of the ordinary vomiting of pregnancy. In the latter, as a rule, the temperature and pulse remain normal and severe pain is not present.

Symptoms.—Pain and tenderness are generally the first symptoms that appear; they are found, usually, but by no means always, in the region of the appendix. These pains are frequently colicky in character, especially in catarrhal and obstructive appendicitis. Fever, as indicated by high temperature and rapid pulse, is always, or at least generally, present. Muscular rigidity is generally present, especially in the right rectus, but is not so distinct as in the non-pregnant state. Other symptoms, such as vomiting, constipation, diarrhœa, and tympanites may be present.

Treatment.—It is not easy to lay down definite rules as to treatment. A large proportion, probably 70 to 80 per cent., of patients with acute appendicitis recover under judicious medical treatment. Subsequent attacks, however, are apt to occur, and it must make one at least uncomfortable to think that, after a patient has passed through two or three or four attacks, she may die from the next recurrence. Of course one must bear in mind the fact that frequently the recovery is permanent. Operative measures are necessary in certain cases under ordinary circumstances. Are such procedures justifiable during pregnancy? Yes, certainly.

Pinard tells us an inflamed appendix requires speedier surgical relief in pregnancy than under other conditions, and the fact of pregnancy must in no other sense influence the operator; in other words, it is wrong to provoke abortion or induce premature labor. There is a focus of infection especially dangerous in pregnancy,

therefore it must be removed. The conscientious obstetrician must always feel anxious when a patient during pregnancy has her first attack of appendicitis, especially when "stormy" symptoms are present.

Medical Treatment.—Osler gives expression to his methods in three words: rest, opium, and enemata. This is exactly the line of treatment recommended by Alonzo Clark and Fordyce Barker, which was generally carried out forty years ago. Many physicians, however, are absolutely opposed to the use of opium in the treatment of appendicitis, because the tendency of the drug is to intensify the intestinal paralysis or paresis and increase the tympanites, thus favoring the development of pathogenic microbes and free migration through the paretic intestinal walls.

Whatever our views may be, I think that the following statements made by Senn should be accepted in their entirety: Laxatives must never be given if there is any indication that perforation has taken place. The moment perforation has taken place all influences must be brought to bear to quiet intestinal peristalsis and to limit the escape of septic material into the free peritoneal cavity.

My own line of treatment is pretty much the same as that for the toxæmia of pregnancy, with perhaps the single exception that I attach much importance to the use of opium in the majority of cases of acute appendicitis. My routine plan is about as follows: Give first calomel followed by saline cathartics, nothing being better than Epsom salts. If after the patient has taken from two to five grains of calomel and two doses of salts the bowels remain unmoved, a rectal enema, not to exceed a quart of soap-suds containing two tablespoonfuls of castor oil and one of glycerine, should be administered. I consider that the catharsis is especially required for the pregnant woman suffering from the disease, because of the natural tendency toward general toxæmia. Free catharsis produces good results directly by eliminating poisons from the neighborhood of the diseased appendix, and this elimination indirectly aids in securing rest for the inflamed part and in quieting the intestinal peristalsis. After free catharsis has been established, give opium if it appears to be indicated, especially for severe pain or if there is any reason to fear perforation.

Senn considers that the best laxative is castor oil given in tablespoonful doses every three hours until the bowels move freely.

I understand that a large number of physicians, especially in the United States, entirely agree with Senn as to the virtues of castor oil, but some prefer to combine it with olive oil, because the latter makes a soothing application to the inflamed surface.

Food.—During the acute stage little or no food should be given by the mouth, but as much water as the patient naturally wishes. When there is vomiting water should only be given in the shape of normal saline solutions, by the rectum or subcutaneously; in all cases solid food and plain milk should be withheld. In giving food by the mouth choose from the following: barley water, rice water, albumin water, whey, broth, thin flour soups, etc.

Surgical Treatment.—There is no doubt as to the fact that when ulcerative appendicitis has given place to perforation or a gangrenous condition, or both, surgical interference is absolutely necessary. Unfortunately, we are not always able to make our diagnosis. The uncertainty which so frequently exists as to exact diagnosis is responsible for many unnecessary operations and also for many dangerous delays.

I shall not attempt to discuss in detail the many vexed questions which have arisen as to methods and time for operation. In a certain proportion of cases early operation—that is, operation within twenty-four hours after the attack of appendicitis—is the correct procedure. The intermediate operation is required in certain cases where complications arise, such, for instance, as the formation of an abscess and the presence of progressive septic peritonitis. The late operation is frequently required when abscesses are found to exist weeks or months after the acute symptoms have subsided.

The operation during the interval between attacks, when no symptom of inflammation of the appendix or surrounding parts is present, is performed by some. I have not seen any cases where I thought an operation was necessary under such circumstances during pregnancy. I should hope, after an attack of catarrhal appendicitis, to prevent the recurrence during pregnancy especially by the eliminative treatment. Following are brief reports of cases with certain comments.

C. K., aged thirty-three. VI para. Attended by me ten years ago. Three months' abortion. Unusual amount of pain before and during abortion; some tenderness. Pain and tenderness over abdomen continued after the uterus was emptied. Patient seen by the late Drs. Strange

and McFarlane in consultation. Two days after supposed completion of abortion uterus examined, curetted with finger-tip, and washed out. Nothing found in uterus. No offensive discharge. Two days afterward patient got much worse. Swelling found in right groin, signs of general peritonitis. Patient died in a few hours. Cause, probably appendicitis with perforation. Appendicitis was not suspected until about twenty-four hours before death.

In this case the patient probably had appendicitis some days before abortion, which, I think, should have been recognized by me earlier than it was. I did not at the time attach sufficient importance to the tenderness, which is more important than the generally accompanying symptom, pain. Without going into further details I may say there were many reasons why I should have suspected appendicitis rather than septicæmia. Whether an earlier diagnosis would have enabled us to save the patient's life I know not.

Pinard, in a paper recently published, quotes two cases of appendicitis complicating pregnancy, in which an erroneous diagnosis was made and a fatal termination ensued. In the one, a patient at full term was, during labor, seized with severe peritonitic symptoms which were attributed to rupture of the uterus. The labor was terminated naturally. On opening the abdomen a gangrenous appendix was found and removed; general peritonitis was present and the patient died some hours later.

In the other, a patient two months pregnant was treated for some days for indigestion with threatening miscarriage. The patient when seen presented all the symptoms of acute appendicitis and died a few hours later.

As a contrast, however, he relates three cases successfully treated by operation during pregnancy.

Case I. Multipara, aged twenty-nine. Six months pregnant. Was seized with violent abdominal pains and vomiting. Rigidity was detected in the right iliac fossa, and *per vaginam* a mass was plainly felt. Appendicitis was diagnosed and, a few days later, operation was performed, a gangrenous appendix being removed. The patient recovered rapidly. Premature labor came on a week later.

Case II. Multipara, aged thirty-four. Pregnant three months. Had for ten days been suffering from a severe pain in the right iliac region, with vomiting and pyrexia. On admission to the hospital her condition was very grave; pulse 120, temperature 102.6°, abdomen much distended with increased resistance over the right iliac region. A diagnosis of

appendicitis complicating pregnancy was at once made. Operation was performed, appendix removed. Rapid recovery.

Case III. Multipara. Five months pregnant. Was seized with severe abdominal pain and vomiting. Five days later, on admission, she was evidently suffering from intestinal obstruction. *Per vaginam* nothing could be made out. Operation performed, appendix was found bound down by a dense band into the right iliac fossa and constricting the bowel. Appendix removed. Patient recovered.

Pinard's conclusions were as follows:

1. Appendicitis may be observed in pregnant women, primiparæ or multiparæ, at all periods of gestation.

2. During pregnancy appendicitis, though often commencing insidiously, has a tendency to become of a very grave type.

3. Operative interference at the earliest possible moment offers the best chance of cure.

4. Even in cases apparently hopeless operation sometimes saves life.

George A. Peters not long since saw a patient after labor who was suffering from abdominal pain, with high temperature and rapid pulse. These symptoms existed to some extent before labor and were not understood. The labor was premature and child stillborn. A few days after labor a lump was found in the right side. Appendicectomy performed about ten days after labor. Patient made a good recovery. In this case, as in my own, the diagnosis was made at a somewhat late period, but fortunately in time to admit of an operation with a very happy result.

Another interesting thing to consider in connection with this case is the relationship between the uterus and the abscess. After the fourth month of pregnancy the side of the uterus generally forms a part of the wall of the appendiceal abscess. Under such circumstances, during and after labor, the contracting uterus may pull on the abscess and injure its wall in such a way as to permit pus to pass into the abdominal cavity and set up progressive or general peritonitis. On the other hand, irritation from the appendicitis may cause abortion. The hyperpyrexia itself, through its fatal effect on the ovum, may also produce abortion. Mundé thought, on account of these possible or probable effects, immediate appendicectomy should be performed in cases of appendicitis, even after the onset of labor. Marx, however, in such cases, prefers to deliver the woman at the beginning of labor by a manual

dilatation of the cervix, and version or forceps, and immediately thereafter tampon the utero-vaginal tract. In Peters's case it is likely the abscess formed after labor.

T. K. Holmes, of Chatham, was called in by Wright and Millen, of Wheatley, to see a patient with the following history:

Aged thirty, four months pregnant, chill, fever, pain and tenderness in the right iliac fossa. On twelfth day after chill, suddenly seized with severe pain in the abdomen, followed by shock and fulness in the right side of the uterus; in a few hours general fulness over whole abdomen. Diagnosis, ruptured tubal pregnancy. Operation. Thin, watery pus found in the abdominal cavity, appendix sharply bent on itself and in an advanced stage of disease. Appendix removed, abdominal cavity flushed, drainage tube left in forty-eight hours. Patient recovered, went on to full term, when a healthy child was born.

In this case the symptoms certainly pointed to ruptured ectopic sac. It is well, however, to remember in such cases that either of the conditions mentioned may be the cause of the symptoms described. A mistake in the other direction not infrequently occurs.

Lusk relates a case where several experienced surgeons thought they felt a large and inflamed appendix distinctly, but an operation showed that the lump which had been detected was a tubal ectopic sac.

Herbert Bruce reports the following case: A patient in the fourth month of pregnancy had acute appendicitis resulting in an abscess. An operation was performed. Patient recovered, went on to full term and had a normal labor.

George Bingham reports the following case: Acute appendicitis during fourth month of pregnancy. Operation. No pus. Recovery. Patient went on to full term; normal labor.

James F. W. Ross has seen two patients with appendicitis during pregnancy, one during the fourth month and the other the sixth. Both recovered without operation and went on to full term.

Bertram Spencer reported the following case: Primipara, had had three attacks of appendicitis before pregnancy. Had fourth attack early in pregnancy. After recovery operation during fourth month. Appendix easily removed. Rapid recovery. Went on to full term; normal labor.

The following case, reported by Hirst, shows an exceedingly fortunate result in a patient who might have been considered in an almost hopeless condition at the time of operation: Acute peritonitis in the fifth month of pregnancy. On opening abdomen found pools of pus lying between the coils of intestine, a gangrenous appendix, and two perforations of the caput coli. The pregnant uterus was turned out of the abdominal cavity,

the pus was carefully sponged out with gauze pads, the appendix amputated and the perforations in the colon were closed by a sero-serous stitch. The uterus was then returned to the abdominal cavity and the wound closed, with gauze drainage for eighteen hours. Patient recovered and went on to full term.

TUBERCULOSIS

The opinions of authorities as to tuberculosis during pregnancy are diverse. It was stated by one of America's greatest physicians, long since dead—George B. Wood—that the occurrence of pregnancy undoubtedly in many instances arrests for a time the progress of the disease and that lactation appears to exercise a favorable influence over it. He even held that the disease might be kept at bay for many years by child-bearing and nursing, so that occasionally the predisposition appeared to be overcome.

Osler tells us that pregnancy and parturition hasten the process of tuberculosis in almost every case.

By a physician who has perhaps had two or three cases under observation, where the tuberculous woman rapidly grew worse during pregnancy and died before full term, or shortly after labor, Wood's statement may be received with surprise. To another who has seen a tuberculous woman improve (apparently, at least) during pregnancy and give birth to a healthy child, Osler's dictum will probably not be acceptable.

SYMPTOMS OF TUBERCULOSIS AS AFFECTED BY PREGNANCY

Fever.—We may have either the initial fever, which generally occurs with the tubercular deposit, or we may have the fever of absorption occurring at a later stage of the disease. Either kind of fever may be more severe than under ordinary circumstances, but probably not as a rule, excepting in cases of miliary tuberculosis.

Anæmia.—Sometimes, but not generally, there is a marked increase of anæmia during pregnancy. We are more apt, however, to have serious anæmia after labor, especially if the patient nurses her child.

Cough.—This is frequently a very distressing symptom and is apt to become paroxysmal as the uterus enlarges.

Dyspnœa.—This also frequently gives rise to extreme distress and is nearly always more marked toward the end of pregnancy.

Hæmoptysis.—Pregnancy does not appear to increase the tendency toward hæmoptysis, excepting in those cases where the tuberculosis becomes seriously aggravated during pregnancy.

Abortion and Miscarriage.—Interruption of pregnancy by abortion and miscarriage is not at all common, even in cases where the cough is severe and persistent. I am unable to explain why excessive coughing and vomiting do not more frequently cause an interruption of pregnancy.

Effects of Parturition.—The influence of parturition on a tuberculous woman is generally unfavorable. As pointed out by Reynolds-Wilson there seems to be during pregnancy a certain physiological equilibrium as to the various functions of the body which, while it may not prevent the invasion of tuberculosis, may offer a barrier to its spreading. Such equilibrium, however, is destroyed by parturition. Pain, nervous tension, loss of blood, and sudden relaxation following delivery, are inseparable conditions in labor, and all contribute to the physical exhaustion belonging to the various stages of tuberculosis. The effects of traumatism incident to labor also seem to give fresh impetus to the tuberculous process. A general dissemination of tubercle, apparently dating from delivery, has occasionally been observed.

The Effects of Lactation.—In a certain proportion of cases the disease develops somewhat rapidly during the puerperium. I leave out of consideration now that rapid general dissemination of tubercle before referred to. The patient generally goes down still more rapidly during lactation. It is not easy in all cases to carry out the rule that a tuberculous woman shall under no circumstances nurse her child. The mother may have plenty of milk and may never have passed beyond the first stage of phthisis. If it be in the interests of the child she may be very anxious to nurse it for a time at least. In this case, as in others, we can not be governed entirely by iron rules. However, we should always keep in view the fact that lactation under such circumstances involves some danger, and if not entirely proscribed, should be curtailed as much as possible.

Effect on Child.—It is not well for the child to be nourished by the milk of its tuberculous mother, chiefly because of the low nutritive quality of such milk generally; otherwise there is probably very little danger of transmission of the disease from mother to child through lactation. Tubercle bacilli are very seldom found

in such milk. In addition, tubercular infection of the intestinal tract in the new-born seldom happens.

Liability to Septicæmia.—It was thought at one time that a tuberculous woman was more apt to suffer from septicæmia than a non-tuberculous. So far as I have been able to learn from clinical observations, by myself and others, liability to septicæmia is not appreciably increased; in fact, I think we may consider that, with ordinary precautions as to cleanliness, etc., our tuberculous patients will not have septicæmia.

Effect on the Fœtus.—One hardly expects to find a healthy fœtus when the patient has advanced phthisis, but this is exactly what we do find in a certain proportion of cases. One of the most important questions which can arise is that referring to the possibility of the infection of the fœtus in utero. Schmorl and Kockel found tuberculous changes in the placenta in all cases of pregnant women dying of phthisis, but they point out that the villi offer considerable resistance to the bacilli; even when the bacilli do pass into the fœtal blood they seldom infect the fœtal organs. It would seem, from their observations, that the fœtal tissues do not offer a favorable nidus for tubercle.

Apart from the results of the investigations of pathologists in this direction, which are still somewhat nebulous, we know from clinical experience that in many cases tuberculous parents beget children without organic tuberculous disease.

It is supposed by some that the fœtus may be infected by the father. That this may occasionally happen is not impossible, but that it frequently happens is at least improbable. Direct paternal infection through tuberculization of the ovum has never yet been demonstrated.

Treatment.—I know of no disease which requires more careful, intelligent, and patient treatment than tuberculosis. We have learned in recent years that judicious sanatorium treatment, under constant medical supervision, is decidedly the most satisfactory. Ordinary treatment at the home of the patient is, under the best of circumstances, less effective. We are moving in the right direction in this country—but so slowly! The saddest feature, from an obstetrical point of view, is that no one in Canada has made the slightest endeavor as yet to make special provision for those suffering from tuberculosis during pregnancy. Sanatorium treatment in our Dominion is inaccessible to such patients, rich and poor alike.

The physician should study both the disease and his patient and should also keep in mind the French maxim: "The prognosis of ordinary pulmonary phthisis depends in reality as much and more on the patient than on the disease." One should look on the bright side, ever remembering that patients with extensive and apparently hopeless pulmonary disease frequently recover under modern methods.

Should a tuberculous woman be allowed to marry? Osler says, "No; especially when with existing disease there are fever, bacilli, etc." He quotes in connection therewith the remarks of Dubois, in which he thinks there is much truth. "If a woman threatened with phthisis marries she may bear the first accouchement well, the second with difficulty, a third never." While we may be inclined to agree with Osler to a large extent, and with Dubois to a less extent, still I think we should not formulate cast-iron rules.

We are fond in these modern days of considering tuberculosis a curable disease. While I freely admit that a woman suffering even from incipient phthisis would have a better chance if she remained unmarried until her disease is cured and has remained cured for a considerable time, I am not prepared to say in her case that marriage should always be prohibited. I can not do better in this connection than give the opinion of Knopf, using largely his own words.

A tuberculous woman should not marry, but there are times when we may deviate from this iron rule. If we are in the presence of a young, highly impressionable woman, in the first stages of pulmonary tuberculosis, who is engaged to be married, it would be cruel and unwise to put a stop to the union. The consequent sorrow brought upon this young woman would simply mean hastening a fatal termination of her disease, while as a happily married woman she has a fair chance of getting well. This is one of the few instances in the practise of medicine where it becomes the duty of the physician to tell the husband that if his wife becomes pregnant before her complete recovery it means danger to her and to the child.

Should abortion be induced on a tuberculous woman, and if so, when?

Knopf tells us never to bring about abortion, adding that it does not save the life of the tuberculous mother. I think it would be well to adopt this rule with slight reservation, having in mind

the possibility of the occurrence of cases where the induction of abortion may save the patient's life. We should consider this question in the light of our present knowledge, that tuberculosis is a curable disease in the pregnant woman as well as in the non-pregnant person. If, then, our patient has tuberculosis during pregnancy, our duty is to treat the tuberculosis and not to murder the unborn child.

We all now probably agree that if the woman is doing even fairly well, interruption of pregnancy is not advisable, but let us consider the patient who is seriously and dangerously ill. Will a violent and unnatural attack on her uterus cure her? Will abortion, induced with the least possible violence, save her? Knopf says positively it will not. He makes this statement after an extended experience in large maternity hospitals in the Old and New worlds.

I can conceive that cases may arise where physicians might decide, after careful consultation, that interference with pregnancy was advisable in the interests of the mother. I am not able now to describe definitely the conditions that should cause us to reach such a decison. I know of cases where, after induced abortion, the patients have done well, but of these I know none where life could be said to have been immediately endangered before the operation.

The induction of premature labor is sometimes called for when there is extreme dyspnœa and anasarca, or when, in certain cases of miliary tuberculosis, the acuteness of the symptoms not only endangers the life of the mother, but threatens the existence of the child.

Management of Labor.—The physician should observe the following rules: Watch the patient carefully; give chloroform and morphine when indicated; complete delivery as soon as possible, employing operative interference when required; prevent hæmorrhage as far as possible.

SUMMARY OF OPINIONS RESPECTING TUBERCULOSIS

From letters received from certain well-known specialists of the United States and Canada I am able to extract the following opinions on certain important points.

Trudeau, of Saranac Lake, considers that pregnancy, labor, and the puerperal state generally have an unfortunate effect on a tuberculous mother. He also thinks that abortion or premature labor

should be induced where the disease is advanced but not in the incipient cases. If the advanced cases are allowed to go to term, the patients suffer greatly from the mechanical conditions caused by the pregnancy and are apt to die shortly after, or even during labor. The effects of modern treatment are beneficial in the incipient cases. He has known a good many women with slight tubercular lesions, who have kept out of doors during their pregnancy and gained after child-birth, who have suffered no harm from the pregnancy, especially when not allowed to nurse their children.

With reference to the children of tuberculous mothers with advanced disease he has found that they are poorly nourished and generally die in infancy either of tuberculosis or some intercurrent disease. In incipient cases the children often thrive and grow up as strong as other children.

Stubbart, of the Loomis Sanatorium, Liberty, tells me that he has not had much experience of pregnancy associated with tuberculosis, but he thinks that pregnancy, labor, and the puerperal state have generally a serious effect upon a patient suffering from tuberculosis. As a consequence he believes that abortion or premature labor should generally be induced, because the mother's life is of more value than that of the fœtus.

Vincent Y. Bowditch, of Boston, holds the opinion that the course of tuberculosis is liable to be checked in some cases during pregnancy, but is apt to begin again after labor, although this is by no means the universal rule. He also considers the induction of abortion or premature labor unjustifiable in all cases except where the life of the mother is in jeopardy. However much we may wish the child had never been conceived, that is no ground for the induction of abortion. As for the mother, the presence of tuberculosis is not in itself sufficient ground for such procedure.

Allen Baines gave me most of the facts in connection with the following case: About thirty years ago a young couple, members of well-known families in Toronto, were married. The groom, a fine vigorous-looking fellow, was supposed to be healthy, but had laryngeal phthisis. The bride was a bright healthy girl. She contracted miliary tuberculosis during pregnancy, gave birth to a daughter at full term, and died a few weeks after. The husband, who had probably infected his wife, died of phthisis in about fourteen years. The daughter is now a strong healthy girl, aged thirty, a professional nurse in Chicago.

About twelve years ago I attended a patient in labor, for James Ross, Sr. She had pulmonary phthisis in the second stage. Healthy child born. Dr. Ross and I thought the mother was not likely to live many weeks. Mother and child are alive now and fairly healthy.

N. A. Powell gave me the following report. A woman had advanced phthisis with numerous cavities. Labor early in the ninth month. Mother died a few weeks after. The child is now a healthy girl, aged fourteen, working regularly in Eaton's store.

I am indebted to N. A. Powell and W. P. Caven for many particulars as to certain patients in the Sanatorium at Gravenhurst. Most of the following facts, however, were communicated to me by J. H. Elliott, the physician in charge. Up to the present time they have had altogether in the Institution five women suffering from tuberculosis during pregnancy.

Case I. Patient improved much; expectoration free from bacilli; very slight cough. Left Sanatorium. Confined at her home three months after; labor normal. Shortly after became engaged in her usual occupation of washing, scrubbing floors, etc. Disease again developed, and she died eighteen months after labor.

Case II. Disease fairly advanced. Interference with pregnancy thought advisable. Went home and under the care of her family physician. Abortion induced in the fifth month. Adherent placenta; subinvolution of the uterus. Returned shortly afterward to the Sanatorium. Health not improved.

Case III. Pulmonary and laryngeal tuberculosis. Went home. Abortion induced. Back in three weeks. Health improving; signs in the chest have disappeared.

Case IV. Patient in advanced stage; softening and excavation in one upper apex and in apex of the lower lobe on the other side. Abortion induced. (Only operation of the kind ever performed at the Sanatorium.) Adherent placenta, free hæmorrhage; uninterrupted recovery. Disease became quiescent and remained so. Apparently in perfect health now.

Case V. Patient with pulmonary tuberculosis, pregnant. Went home. Latest report from her, now near full term: no extension of the disease.

It will be noticed that in these five cases abortion was induced on three patients. In only one case, however, did the physician of the Sanatorium interfere with the continuance of pregnancy. This was done after consultation and careful consideration of three physicians, all being agreed as to the advisability of the procedure.

As to the other two on whom abortion was induced, I can not discuss details, but in one I think the operation would not have been considered necessary if the patient could have been kept under careful supervision in a maternity sanatorium. I sincerely hope that we shall soon have one or more institutions of this kind in Canada. The patient who went on to full term and had a normal labor died about eighteen months after, but it is quite probable that, with ordinary care, good food, and proper treatment, her life could have been saved.

The following cases have been observed by A. McPhedran and W. Goldie, as reported to me by Goldie:

Case I. Had an outbreak before marriage. Good health when married. Outbreak after marriage, lasting five months. After this had three pregnancies going to full term. In good condition during each pregnancy. Three children, all well now. Mother had an outbreak after the last labor, lasting seven months.

This is a remarkable history. A woman with active tuberculosis before and after her marriage is now fairly well, with three children living. This is exactly what Dubois said could never occur.

Case II. Had two outbreaks before marriage. Good health when married, good health in first pregnancy. Outbreak soon after labor, lasting six or seven months. Baby died, aged four weeks, of intestinal disturbance. Became pregnant a second time, five months after labor, during an outbreak. General health improved, lung symptoms disappeared, child born at full term. Mother remained in good health for four years; then bacilli found in sputum during bronchitic attacks. Second child died, aged sixteen, of acute pneumonic tuberculosis. During sixteen years, after the birth of a second child, abortion was induced five times. Lung symptoms always grew worse after each abortion.

It is interesting to note in this case that pregnancy occurred during an outbreak, that the lung symptoms soon disappeared, and the patient continued well up to the time of labor.

Case III. One outbreak before marriage. Fairly healthy when married. During first pregnancy had better health than before marriage, but during lactation had an outbreak which lasted for a few months. Child is very neurotic and has tuberculous cervical adenitis.

Case IV. Condition before marriage unknown. Had tuberculosis, at least, for many years of married life. Had six children. One child

died in infancy, mother "coughing" at the time. Another died aged eighteen, of acute pneumonic tuberculosis. Some improvement in health during last pregnancy, but she died two weeks after labor. Child now aged twenty and in good health.

Case V. Condition before marriage unknown. Has had chronic fibroid phthisis probably during the whole of her married life. Is fairly healthy. Only one serious outbreak after second labor. Had four children. Three died of pneumonic tuberculosis, all aged over sixteen. The oldest son has now pulmonary tuberculosis.

In some cases, especially of laryngeal phthisis, the dyspnœa may be so serious as to endanger life or even cause death. This is well illustrated by a case reported to me by George McDonagh.

About twelve years ago he saw a patient with Frederick Winnett, early in the first stage of labor. The dyspnœa was so pronounced that they feared every minute that the woman would become asphyxiated. Intubation was at once performed. Instantaneous relief was afforded and labor progressed favorably. Healthy child was born, but the mother died two days after the intubation.

CARDIAC DISEASES

The subject of cardiac disease is very interesting to the obstetrician from many points of view, particularly in connection with marriage, pregnancy, and labor. Certain questions arise in the consideration of these various points, especially in their practical or clinical aspects.

Marriage Not Prohibited.—Should a woman with valvular cardiac disease be allowed to marry? I think the answer to this question should be: "Yes, with certain exceptions." Matrimony should not be forbidden when a lesion in the heart is compensated and no complication has arisen; but it should be forbidden when there are any serious symptoms of cardiac disturbance present, attacks of dyspnœa, breathlessness, palpitation on exertion, or hæmoptysis.

In a large proportion of cases, probably the majority, the physician is not consulted in the matter. Frequently the refusal to sanction a marriage makes no difference in the course of events. I have for years entertained the opinion that a young woman having valvular lesions of the heart, who can carry out her social and domestic duties without any serious symptoms of ill health, should

not be prevented from marrying, although I freely admit that child-bearing is likely to aggravate the dangers connected with heart disease. I may say at the same time that I fear the dangers of pregnancy and labor in such patients less than I did some time ago.

In one case a young woman was married contrary to the advice of her physician, and when pregnancy promptly followed, the young bride and her mother fully realized the serious aspects of her condition and asked their physician to induce an abortion. When called in consultation I refused to consent to such procedure on account of the absence of any serious symptoms. This young woman is now the mother of two healthy children aged four and two respectively, and is herself enjoying fairly good health.

Serious Heart Lesions.—Which of the heart lesions is the most serious? It is generally acknowledged that mitral stenosis is the most dangerous condition. This was pointed out very clearly many years ago by Angus Macdonald, and writers, since the publication of his work, such as Galabin, Berry Hart, and others, agree with him. The rarer conditions of aortic stenosis and aortic regurgitation are dangerous, but not so much so as the mitral stenosis. Mitral regurgitation alone is not as a rule a matter of serious import.

Effect of Pregnancy.—How does pregnancy affect the system in cases of heart disease? It is apt to disturb compensation and the backward pressure may primarily overload the pulmonary circulation, causing serious thoracic complications and interference with the functional activity of other organs, especially the kidneys and liver. Sometimes the general disturbance induced causes abortion, although I think not so often as has generally been supposed.

I formerly thought that the loss of balance throughout the system was apt to cause eclampsic toxæmia; but, although albuminuria and dropsy are common complications, I am now doubtful about the frequency of convulsions in such cases. In many of the cases pregnancy appears to produce no ill effects whatever. Dakin says that sometimes the patients appear to improve during pregnancy, owing to the hypertrophy of the heart natural to this period. Some of my patients, especially those having mitral insufficiency, have seemed better during pregnancy than they were

before, but sometimes they have lost ground after labor, especially during lactation.

Treatment During Pregnancy.—Notwithstanding the favorable issue in a large proportion of cases, every patient should be carefully watched during pregnancy and should be carefully treated when serious symptoms appear. The following rules should be observed in such cases:

1. *Keep the patient at rest without going to extremes.* A certain amount of exercise and recreation is frequently, if not generally, beneficial. Enjoin absolute rest, however, if serious symptoms appear.

2. *If the equilibrium of the circulation is disturbed, as shown by the ordinary pulmonary symptoms of dyspnœa, etc., administer cathartics, especially calomel followed by Epsom salts.*

I believe that in cardiac disease of pregnancy with serious symptoms, especially if there is systemic toxæmia, the proper administration of Epsom salts will accomplish more good than all other remedies (including rigid dieting) put together. Next to saline cathartics I would place strychnine and digitalis (or strophanthus). For marked dyspnœa one may use nitrite of amyl, which affords more prompt relief for this distressing symptom than any other medicine, so far as my experience goes. Frequent dry cupping of the thorax in the region of the heart is at times beneficial and is always safe.

3. *Regulate the diet.* A great many still believe with Charpentier, Vinay, and others, that a milk diet in these cases is the best. I allow and generally encourage my patients to drink as much milk as they like, but no more.

The patient may select from the following: milk, buttermilk, kumiss, tea, water, lemonade, table mineral waters, fish, oysters, most acid fruits (strawberries doubtful, frequently injurious), green vegetables, including spinach, lettuce, cabbage, cauliflowers, celery, radishes, rhubarb, green peas, and beans, green corn on the cob, carrots, onions, pickles, table bread, breakfast rolls, toast, potatoes, a limited amount of pepper, salt, and vinegar for flavoring, oatmeal, corn-meal, rice, tapioca, and the like. Chicken every other day. Any kind of meat once a week.

She should avoid meats excepting as recommended, meat broths, eggs, cheese, asparagus, sweet potatoes, turnips, beets, sirups, candies, sweet fruits, such as grapes, bananas, raisins,

pears and preserved fruits. If there is no albuminuria meat and eggs may be added to the prescribed list.

4. *Give no diuretic remedies excepting water.*

5. *Recommend the ordinary daily warm bath to keep the skin acting properly and nothing else.* The wet pack, so dear to some physicians, is, I think, useless and frequently objectionable.

6. *It is sometimes advisable to induce abortion.* This radical method of treatment is seldom required. If marked failure of compensation occurs early in pregnancy, as shown by serious pulmonary congestion, urgent dyspnœa, and the like, the patient should in the first place receive appropriate treatment. If the symptoms become worse instead of better, operative interference may be deemed advisable. Many women, especially Roman Catholics, will not consent to any such procedure. Of course, in such instances the patient's decision should be final. It is extremely difficult to lay down definite rules. I am less inclined to interfere in such cases than I was years ago.

The following case, hereafter described as Case II, caused me much perplexity but was very instructive:

Patient, three months advanced in pregnancy, had mitral stenosis. Had severe dyspnœa on exertion, palpitation, rapid pulse. Similar symptoms had appeared before pregnancy on various occasions. At one time the pulmonary congestion was marked and caused hæmoptysis. After careful deliberation, and with considerable hesitation, we decided to wait for one month, and watch the effect of treatment. The patient went on to full term.

It has been pointed out by Hanfield-Jones and others that many women go through early pregnancies with comparatively little danger, but each pregnancy causes a certain deterioration of the heart muscle which is more or less permanent; therefore, the danger of cardiac insufficiency becomes greater with each successive pregnancy. This does not apply to all cases; I have seen more than one patient in whom pregnancy did not cause any apparent deterioration of the heart muscle.

7. *We have sometimes to consider the advisability of inducing premature labor.* Angus Macdonald was decidedly opposed to this procedure, because it was "likely to do greater harm than good by disturbing the action of the heart and the condition of the lungs." I think there is a pretty general consensus of opinion among

obstetricians who have devoted much attention to this subject that these views are correct. My own experience leads me to believe that the patient has the best chance when this operation, which is always more or less an act of violence, is not performed. The rule is not to induce premature labor in such cases; but it is not absolute. It might happen that some symptoms would arise so urgent in nature that interference should be considered necessary.

Effect on Labor.—How does valvular disease of the heart affect labor? I am not sure that it produces any visible effect in the majority of cases. I have sometimes looked forward to certain labors with fear and trembling; and, much to my surprise, have frequently found them apparently normal in all respects.

Symptoms.—The symptoms during labor are not generally different from those which are found during the last few days, or even weeks, of pregnancy. The most serious are dyspnœa, hæmoptysis, præcordial distress and palpitation. Respiration and pulse are generally much quickened. The dyspnœa and other symptoms are aggravated when the patient is in the recumbent posture. On this account the patient is in many cases compelled to sit up wholly or partially even while sleeping.

Prognosis.—Careful observers give mortality rates ranging from 10 to 60 per cent. Many writers who treat the subject carefully in other respects fail to give statistics. I think it unfortunate that such is the case, because I believe more complete details as to results would show mortality rates much less alarming than those which I have quoted. I believe that the publication of such reports has caused many practitioners to induce abortion when there is no necessity for such procedure.

No statement has surprised me more than that made in three modern American text-books on midwifery, viz., Jewett's Practise of Obstetrics by American Authors; the American Text-book of Obstetrics, and Davis's Treatise on Obstetrics—that in cases of mitral insufficiency the proportion of deaths is 13 per cent. In the three books there is little or no evidence as to the origin of the unlucky thirteen. In connection with the statistics referred to I can not help thinking that various authors have been misunderstood, because they have referred to those cases only where compensation has been seriously interfered with. In addition, it is well to remember that some of these statistics are founded on results obtained during the pre-Listerian era. Judging from what I have

observed I am fully convinced that the mortality rates which I have quoted, i. e., 10 to 60 per cent., are altogether wrong, or at least misleading. Some of our physicians appear to take a less gloomy view than the obstetricians. Osler, in speaking of valvular lesions of the heart, says: "Pregnancy and parturition are disturbing factors, but are, I think, less serious than some writers would have us believe."

Treatment During Labor.—I have already indicated the medicines which are generally recognized as most suitable during pregnancy. The same line of treatment should be carried out during labor. Strychnine and digitalis (or strophanthus) are given to help the heart's action; nitrite of amyl or nitroglycerin (glonoin) for dyspnœa and præcordial distress. The amyl acts more promptly, while the glonoin acts well when given in small doses for days at a time during the latter part of pregnancy. The application of a cupping-glass over the heart helps both dyspnœa and irregularity of pulse. Chloroform should be administered during the latter part of the first and the whole of the second stage of labor.

Many obstetricians in Canada and elsewhere think that chloroform is dangerous in labor if the patient has heart disease. At one time I held a similar opinion, but increased experience leads me to believe that chloroform is not dangerous; on the other hand, I think it materially aids in mitigating some of the serious symptoms. Fothergill says that heart disease in labor is no contraindication for chloroform. Ether, as a rule, is contraindicated, particularly on account of the pulmonary complications.

The patient should be prevented from straining or "bearing down." At the completion of the first stage it is better, as a rule, to deliver with the forceps. Sometimes the patient should be allowed to sit with her head and shoulders held up or propped up with pillows. It is sometimes advisable to have the patient in such a position that her buttocks are projecting over the edge of the bed, while an assistant stands on either side grasping a leg or a thigh and foot so as to prevent her from slipping on to the floor. It is well to apply an abdominal binder before delivery, which should be tightened during the passage of the child. At the same time a free hæmorrhage is beneficial and should be encouraged. The object of the binder is to compensate for the sudden diminution of the intra-abdominal pressure. It should, therefore, be applied above the level of the uterus in such a way that it will not

prevent slight uterine relaxation, or, in other words, in such a way as not to prevent free hæmorrhage. With the same object in view the use of ergot should be avoided. Fothergill and others advise free venesection from the arm if symptoms of embarrassed circulation persist.

Hart says that the most dangerous time for the patient in such cases is the third stage. This is probably correct, but it is well to remember that grave danger exists for several days after delivery, and, in fact, very watchful care is required for weeks.

I shall not now make any further reference to mitral insufficiency. Not long since I presented to one of our medical societies a report of eight cases of mitral stenosis, sometimes accompanied by aortic stenosis. From these I shall select four, which furnish various points of interest. One of the cases I shall give in detail because it was in several respects the most serious and the most interesting I have ever seen, and also because it shows the general line of treatment. Among the eight cases one patient died, while seven made good recoveries. The patient who died got through her labor fairly well and progressed favorably for several days afterward until the sixth day, when death occurred suddenly. I think it quite possible that this patient might have been saved if she had been properly nursed in a comfortable home or hospital.

Case I. Mrs. K., aged thirty-two. I para. Dr. Caven's patient. Saw her in consultation when three months advanced in pregnancy. For two or three years previously she suffered more or less from symptoms due to heart disease. Dyspnœa on exertion very serious at times; a few attacks of hæmoptysis; mitral stenosis; loud presystolic murmur. Dr. Caven feared results if pregnancy were allowed to continue. I advised waiting at least a month. We decided on so doing with the understanding that I was to take charge of the patient. No serious symptoms afterward. In fact, she seemed better during the latter half of pregnancy than during the first half. Labor—at full term—uneventful up to the end of the first stage; no chloroform administered; delivered with forceps; healthy child; good recovery.

Case II. Mrs. S., aged thirty-two. II para. Dr. Graef's patient. Saw her in consultation early in labor. She had suffered much during pregnancy from dyspnœa and marked præcordial distress. When I arrived labor was slightly advanced; os partially dilated. She was suffering much from dyspnœa and distress in the region of the heart; she was unable to lie down; had a well-marked presystolic murmur; also aortic murmur. Inhalation of nitrite of amyl afforded marked relief. We also

administered strychnine and digitalis and a little chloroform. I was unable to remain long; Dr. Graef delivered her with forceps about four hours after I left; child dead; patient appeared to be doing fairly well for some days, died somewhat suddenly the sixth day after delivery. Patient was a poor woman, living in a small house without any conveniences; no proper nursing. She refused to go to a hospital.

Case III. Mrs. X., aged thiry-five. Primipara. Had suffered for years from mitral stenosis and had been under the care of Dr. Caven, who consulted me about the case and requested me to help him in her confinement. When labor commenced Dr. Caven was out of town and I took charge. Labor fairly easy for an old primipara; no serious symptoms, but patient had two large pillows under head and shoulders; waited about half an hour after full dilatation, because symptoms were not urgent, and I was afraid of the perinæum; administered a little chloroform; finally delivered easily with forceps. I had a competent and experienced nurse to assist me, and did not call any one in to administer the anæsthetic. I would not, however, advise others to follow my example in this respect. Healthy child. Good recovery.

Case IV. Mrs. C., aged thirty. III para. She had been under the care of Dr. J. F. W. Ross, in the Pavilion of the Toronto General Hospital. He sent her to the Burnside Lying-in Hospital to be placed under my care during her confinement. She had been suffering for some years from mitral stenosis. I first saw her in the Burnside three days before the onset of labor. She had severe bronchial catarrh with slight hæmoptysis at times, urgent dyspnœa, and marked præcordial distress. Was unable to lie down even for a few minutes, but lay propped up in bed almost in a sitting posture. Her sufferings were great and her general condition alarming. After a consultation with Dr. Ross, we decided not to interfere, but to watch and treat symptoms. Dr. Ross had prescribed strychnine, digitalis, and stimulants. I continued on the same line, also prescribed amyl nitrite, to be administered occasionally. Her respirations were rapid, between 40 to 50 at times. Pulse from 120 to 170, sometimes could not be counted. Patient was very carefully watched by the resident assistants, and the head nurse, Miss McKellar. I feared she would not live until labor commenced, but did not feel that I dared interfere. Labor commenced on the morning of January 27th, and continued during the day. The os was fully dilated at 5 P. M. Dr. McEachren administered chloroform, the patient being held in the sitting posture on the edge of the bed by two members of the resident staff, while I delivered with forceps. A binder was put around the abdomen, and tightened during and after delivery. Fairly free hæmorrhage followed and was encouraged. The dyspnœa and distress continued for hours. At times we thought she was dying. We gave strychnine and digitalis and small doses of whisky, but she was still unable to lie down for some days after delivery. About the fourth day the symptoms became less severe.

After that, recovery was somewhat rapid, and in one month she went out of the Burnside fairly well. The baby was healthy, though not large, and became a great pet among the nurses. He left the hospital with his mother, under the properly legalized name of Adam Ross Cooper. The onlookers, and others who heard of the case, were surprised at the administration of chloroform under such circumstances, but, as I have already discussed this procedure, I shall only add that I believe the chloroform was a decided benefit to the patient.

SYPHILIS

The local primary manifestations of this disease are very serious on account of the hyperæmia of the pelvic organs during pregnancy. The period of incubation is generally two weeks, although it may occasionally be longer—up to six weeks. The initial lesion develops rapidly and extends over a large area, affecting sometimes the vagina, the vulva, nates, and the inner sides of the thighs. There are also reddening and excoriation of the skin and mucous membrane, œdema, eczema, and occasionally abscesses and extensive sloughing.

We have the three stages under ordinary circumstances, but when the disease is contracted during pregnancy the primary symptoms are those which are most marked. The second stage is comparatively mild and unaccompanied by the ordinary syphilitic fever. There is, however, a certain proportion of cases accompanied by fever, but this fever is, I think, more apt to occur in the primary stage. We have to consider the disease in three aspects: 1, As to the effect on the mother; 2, as to the effect on the fœtus; 3, as to the tendency to cause abortion.

Mother.—Although the symptoms, apart from those associated with the primary manifestations, are generally mild, it happens that in a certain proportion of cases the disease is accompanied by serious symptoms, especially when septic bacteria are added to the germs of syphilis. In the majority of instances the disease, as far as the mother is concerned, may be, to a large extent at least, controlled by careful and judicious treatment.

Fœtus.—As far as the fœtus or child is concerned the prognosis is more favorable in syphilis acquired during pregnancy than when it has existed before impregnation. When it is acquired during fruitful coitus, or very early in pregnancy, the fœtus will probably die; when acquired late in pregnancy the fœtus will

probably live. The child may occasionally be infected during labor.

Tendency to Cause Abortion.—Practically death of the embryo or fœtus means abortion. When a syphilitic woman becomes pregnant early abortion usually occurs, and in succeeding pregnancies abortion generally recurs, but it often happens that each abortion occurs a little later than that which immediately preceded it.

When the father has syphilis a number of years before marriage and the mother is free from the disease, the father, if he has tertiary syphilis, may infect the child. In consequence, the child may die or may be born with syphilis or may develop it within a few weeks. The mother at the same time may show none of the ordinary symptoms of syphilis, and yet we know that every woman under these circumstances is to some extent affected.

Hereditary Transmission.—According to Osler this is most common from: (*a*) The father, the mother being healthy (sperm inheritance). Congenital syphilis from paternal infection is only too common. A syphilitic father may, however, beget a healthy child. On the other hand, in very rare instances, a man may have had syphilis when young, undergone treatment, and for years presented no signs of disease, and yet his first-born may show very characteristic lesions. Generally, however, if the treatment has been thorough, the offspring escapes. The closer the begetting to the primary sore the greater the chance of infection. A man with tertiary lesions may beget healthy children. As a general rule it may be said that with judicious treatment the transmissive power rarely exceeds three or four years.

(*b*) Maternal transmission (germ inheritance). It is a remarkable and interesting fact that a woman who has borne a syphilitic child is herself immune and can not be infected, though she may present no signs of the disease (Colles's law). In the majority of such cases the mother has received a sort of protective inoculation without having had actual manifestations of the disease. A woman with acquired syphilis is liable to bear infected children. The father may not be affected. In a large number of instances both parents are diseased, the one having infected the other, in which case the chances of fœtal infection are greatly increased.

The following important practical question arises. Should an apparently healthy woman, who has given birth to a syphilitic

child, be permitted to suckle it? "Yes. She may suckle her child in safety without contracting syphilis from it." In the same connection another interesting question arises. Should a healthy wet-nurse be allowed to suckle the child? "Decidedly no, because if she does she will likely get the disease from the child." I think it is Fournier who makes the statement that laws should be enacted, positively forbidding healthy women from nursing syphilitic children.

(*c*) Placental transmission. The mother may be infected after conception, in which case the child may be, but is not necessarily, born syphilitic.

Syphilitic Fever.—As before intimated, we do not frequently find syphilitic fever during the secondary stage either in the pregnant or puerperal state, although we have every reason to believe that it does occur in a small proportion of cases. I think, as before stated, that syphilitic fever, in connection with pregnancy or the puerperium, is more apt to occur during the primary stage while the initial lesion is so well marked. As an instance of this the following case is related, as reported for me by Dr. Helen MacMurchy:

A. K., aged seventeen. Under care of Dr. A. H. Wright at Burnside. At the onset of labor, July 17th, 1901, the head nurse reported a sore (of which the patient had never before complained) upon the inner aspect of the right labium minus. On examination this sore was found to be much inflamed and indurated, about 2 inches in length and 1 inch broad, with a central ulcer of characteristic appearance. Child delivered by axis traction forceps, no laceration. The accompanying copy of the Burnside chart shows the temperature and indicates the involution of the uterus. Thus the position of the umbilicus ⊙ is 5½ inches (13 cm.) above the symphysis pubis, and the fundus uteri, on the fourth day, was 4 inches (10 cm.) above the symphysis. No explanation of the high temperature suggested itself, except that it was due to syphilitic infection, and the patient gave a history which supported this view. Iodoform and calomel were dusted freely over the sore but caused so much irritation that a solution of lysol, 1 dram to the pint, was used instead. Internally, 20 minims of hydrarg. bichlor. 1 in 1000 was given four times a day, well diluted, but this treatment had to be discontinued at the end of a week on account of nausea. An inunction of ung. hydrarg. was then ordered. August 13th patient discharged, sore almost entirely healed, no other symptoms developed. September 4th reported herself quite well and strong, but there was an eruption on the child which was thought to be specific.

Marriage.—Fothergill gives the following rules as to marriage. A man who has syphilis must not marry: 1, Until he has undergone a course of mercurial treatment. 2, Until three or four years have elapsed from the time of infection. 3, Until he has remained free from symptoms for one and a half or two years. Cerebral symptoms should always prevent marriage.

Treatment.—Every pregnant woman who has syphilis before pregnancy, or contracts it during pregnancy, or has been impreg-

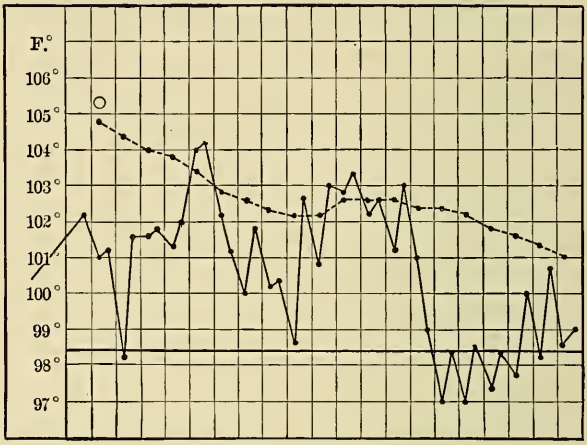


Fig. 117.

nated by a syphilitic man, should undergo a course of systematic treatment and should receive mercury and iodide of potassium. As to mercury, the preparations most commonly used are the bichloride and protiodide. The bichloride and iodide of potash may be given together as in the following formula:

℞ Potassi iodidi ..... ʒ ij vel. ʒ iv;
Hydrarg. chlor. corros ..... gr. ss
Sirup aurant. cort. ..... f ℥ j;
Aquæ ..... q.s. ad. f. ℥ ij.

M. Sig. One teaspoonful in milk three times a day.

The protiodide of mercury may be administered: $\frac{1}{8}$–$\frac{1}{3}$ grain in pill form three times a day, and every second day add one pill, carefully watching the effect on the patient at the same time. When the drug shows its physiological effects by griping pains in

the bowels, or diarrhœa, or fetid breath with tenderness of the gums, the dosage should be cut down by one-half. In a large proportion of cases the preparations of mercury are not well borne by the stomach. It is probably better, therefore, as a rule, to use inunctions of mercury, using one dram of blue ointment daily, as follows: The patient should first take a warm bath, then have the mercury well rubbed in over the inner surface of the forearm and arm, the axilla and along the side of the chest, for fifteen minutes. A shirt, kept for this purpose, should be put on next the skin, and the ordinary clothing worn over this; the next night the opposite arm and side of the body should be the seat of inunction; next, the right groin and inner surface of the right thigh; next, the same regions of the opposite side of the body; finally, the anterior surface of the chest and abdomen. The object of changing about is to avoid irritation of the skin (Hare). Instead of blue ointment the oleate of mercury (10 per cent.) may be used. At the same time let the patient take by the mouth 15 grains (.97 gm.) of iodide of potassium, in milk, three times a day after meals. This treatment should be carried out during the whole of pregnancy and for a long time after.

GONORRHŒA

Gonorrhœa is in many ways sadly interesting from an obstetrical standpoint. On account of the hyperæmia of the pelvic tissues acute gonorrhœa during pregnancy is generally of a very severe type and sometimes assumes almost a malignant character.

Diagnosis.—The chief symptoms are painful micturition and purulent discharge from the vagina, a burning pain in the urethra with frequent micturition and also burning pain in the vulva and vagina. The nature of the gonorrhœal discharge is probably not so well understood as it should be by general practitioners. All pregnant women have more or less vaginal discharge which we call leucorrhœa. One may learn a good deal as to the nature of the discharge by asking two or three simple questions. What is the color? Is it fetid or offensive in character? If it is white and does not stain the linen one may conclude that it is the ordinary leucorrhœa of pregnancy. If it is yellow and fetid one should suspect that an abscess, such as pyosalpinx, an ovarian abscess, or

a suppurative ovarian cyst, has ruptured into the upper part of the vagina. If there is a yellow or greenish discharge, which is not perhaps fetid but slightly offensive, it is usually due to gonorrhœa. A yellow purulent discharge, slightly offensive, from the vagina and urethra, with burning and painful micturition, will nearly always indicate the existence of gonorrhœa. The discovery of the presence of the gonococcus will, of course, make the diagnosis certain. Bartholin's glands are generally involved. Further references as to the way it spreads are made in another chapter (see page 476).

Treatment.—This should be carefully carried out in a thorough manner in order to cure the disease as soon as possible and also to prevent the terrible sequelæ which are apt to follow. To order a woman to use an antiseptic douche is almost useless. Even the most thorough kind of douching, with the woman lying on her back, is generally not sufficient. The ridges and folds in the vaginal mucous membrane prevent the solution from properly cleansing it.

One should keep the patient in bed, keep the bowels open with Epsom salts, restrict the diet, and employ vigorous local treatment. Davis's method, as given in his text-book (first edition), is an excellent one. His description of it is as follows: Place the patient upon her back across a table or bed, and thoroughly douche the vagina with a quart of warm water, containing an ounce of the tincture of green soap, or two quarts of castile soap-suds. The purpose of this cleansing douche is to remove the pus and mucus which cover the mucous membrane and harbor gonococci. To do this cleansing properly it may be necessary to use a rubber speculum, often a round speculum is most convenient; the vagina should then be thoroughly irrigated with a solution of bichloride of mercury, 1:1000. Absorbent cotton should be taken in a pair of forceps, or wrapped upon an applicator, and the interior of the cervix thoroughly but gently cleansed with mercurial solution. When this has been done the urethra should be inspected and wiped out for an inch or more in its extent in the same manner. This must be followed by a douche of simple warm water. The vagina is then tamponed with gauze containing 50 per cent. of iodoform, the external parts should be thoroughly washed with soap and water, then rinsed with water and douched with a bichloride solution, 1:1000. A dressing of bichloride gauze, 1:2000, over the vulva is kept in

position by a T bandage. This thorough cleansing should be repeated daily until the disorder grows perceptibly better.

As the disinfection of the vulva and vagina is a very painful operation, it should always be done under an anæsthetic. Otherwise it is impossible to do the cleansing efficiently.

The greatest care must be taken to have the patient pass her urine without the use of a catheter on account of the danger of infecting the bladder. As soon as the discharge ceases to be purulent and becomes mucoid, the douche of mercurial solution should give place to lysol, 2 per cent., or carbolic acid, 2 per cent. Should cystitis occur the bladder must be washed out two or three times in twenty-four hours with lysol, 1 per cent., or saturated solution of boric acid. It is also well, in these cases, to give the patient boric acid, or urotropin, internally if fever is present. For the chronic gonorrhœa, which is unsuspected by the patient, vaginal irrigation with lysol, 2 per cent., and tincture of green soap may be carried on by the patient herself several times daily, until the discharge ceases. The following formula is useful:

Lysol..... ℥ ij;
Tincture of green soap..... ℥ iv.

A teaspoonful in a quart of warm water as vaginal douche, night and morning.

The worst case of gonorrhœa that I have seen was in a patient infected about two weeks before labor. I treated her daily for eight days before confinement, first douching with lysol solution, then applying a solution of nitrate of silver, 30 grains to the ounce, through a Ferguson's circular speculum. Douches were continued daily, sometimes using lysol, sometimes protargol. The discharge was very much diminished, but the patient was by no means cured when labor came on. Healthy child; no ophthalmia. In spite of careful treatment after labor the disease spread to the Fallopian tubes or past them, causing localized peritonitis.

When a patient refuses to submit to efficient local treatment Eden uses medicated vaginal pessaries, a favorite one being a pessary made of gelatine, or ordinary cocoa butter, containing 20 grains of iodoform and 10 minims of oil of eucalyptus. This can be passed into the vagina when the patient goes to bed. It melts and the solution flows over the vaginal walls and into the folds and depressions. Douches should be used in addition.

CHAPTER XIII

DISEASES OF PREGNANCY AND THE PUERPERIUM

DISEASES OF THE KIDNEYS

Pathological Conditions.—The following pathological conditions of the kidneys may be found during pregnancy: 1, The toxæmic kidneys of pregnancy; 2, acute nephritis arising during pregnancy; 3, chronic nephritis with pregnancy.

Toxæmic Kidneys. Leyden, who speaks of "the kidneys of pregnancy," as if pregnancy always produced pathological conditions in the kidneys, says the condition is not a true nephritis, but simply an anæmia of the kidneys which leads to fat infiltration in the epithelium, especially of the convoluted tubes. There is a functional disturbance produced by the pregnancy, which disappears after the termination of pregnancy. The symptoms, which are likely to appear in the second half of pregnancy, are dropsy and albuminuria. The urine is deficient in quantity and contains, in addition to albumin, cylinder casts, renal epithelium, and white and red blood corpuscles. Eclampsia is apt to occur. This is a good description of a condition usually found in connection with the general systemic toxæmia of pregnancy, but not commonly present in the kidneys during normal pregnancy. The word toxæmic as applied to the kidneys, under such circumstances, will give us a better conception of their true condition.

Nephritis arising during Pregnancy. The general health is more affected than in the toxæmic kidneys of pregnancy. Hypertrophy of the heart is soon produced (earliest in about six weeks). Retinitis and cerebral hæmorrhage may occur in the later stages.

Chronic Nephritis with Pregnancy. The symptoms are similar to those due to nephritis arising during pregnancy, but are apt to be more severe. Uræmia, without convulsions, may occur in either case, but eclampsia is rare.

SYMPTOMS OF NEPHRITIS

Albuminuria. Albumin is found in the urine of women during pregnancy in from 5 to 10 per cent. of the cases. Albuminuria is a symptom of great importance; but it is only a symptom of a disease and not the disease itself. By some the term has been applied to that diseased condition of the system which gives rise to eclampsia. During the last few years the term general toxæmia of pregnancy has been used for this poisoning, which affects various organs, or perhaps all the tissues of the body. We shall consider albuminuria a symptom of some local condition of kidneys which may or may not have existed before pregnancy, or a symptom of general toxæmia with kidney disease or kidney insufficiency.

Many theories have been advanced as to the cause of albuminuria peculiar to pregnancy, such as the following: obstruction of ureters by pressure of the gravid uterus; increased work thrown on the kidneys by the addition to the blood of fœtal waste products; increased arterial pressure of pregnancy; pressure of uterus on renal veins; action of a special form of micrococcus. Theorizing upon this subject is interesting, but these "causes" are mostly mere conjectures.

The presence of albumin may be due to a leucorrhœal discharge which is added to the urine. To clear up any doubt it may be necessary to withdraw some urine by catheter. As there is always some danger in catheterization, in spite of antiseptic precautions, it may be well to order the patient to use a vaginal douche and then insert into the lower part of the vagina a small tampon of absorbent cotton with a string attached, before urinating. It is also probable that traces of albumin may be due to a slight catarrh of the bladder, which is not unusual in pregnancy. The urine should always be filtered to exclude cellular sources of albumin before testing for that substance.

When albuminuria is found early in pregnancy it is generally due to nephritis. When it appears in the seventh, eighth, or ninth month of gestation it is usually due to a general toxæmia, with which there is generally associated the toxæmic kidneys of pregnancy. There is an impression very largely entertained that early albuminuria indicates a strong probability that the patient will have what is commonly known as puerperal eclampsia; or, to put it in another way, early acute nephritis, or chronic nephritis which

existed before pregnancy, is likely to cause convulsions. Such an opinion is not correct. Nephritis does not, as a rule, cause eclampsia, although it somewhat frequently causes uræmia without convulsions (as mentioned, p. 272).

The Urine.—It is unnecessary to say much about the casts in the urine, and the increase or decrease in quantity under the different conditions which may exist. In acute nephritis, as in the toxæmic kidneys of pregnancy, the urine is scanty and at times suppressed. It is smoky and has a high specific gravity, contains a large quantity of albumin, hyaline, blood, and epithelial casts, free blood, and epithelial cells. In chronic parenchymatous nephritis (large white kidney) the urine is generally diminished, although it is sometimes normal in color and in appearance; it contains much albumin, together with hyaline, fatty and granular casts, and fatty epithelial cells. In chronic interstitial nephritis (contracted kidney) the urine is increased in quantity, pale in color, has low specific gravity, contains only a trace of albumin and a few narrow hyaline casts. It occasionally happens that a chronic interstitial nephritis is complicated by a more or less acute tubal nephritis. In such an event the urine would probably be diminished in quantity, and would contain an increased amount of albumin and some blood.

Œdema.—Dropsy, often seen in the face, is an ordinary symptom of acute or chronic parenchymatous nephritis and frequently appears early in pregnancy, while the œdema due to the ordinary toxæmic kidneys generally appears in the latter part of pregnancy.

Affections of the Eyes.—Affections of the eyes are very commonly due to chronic interstitial nephritis, but also frequently to the general toxæmia accompanying the kidneys of pregnancy. These affections are chiefly retinal hæmorrhages and white spots of retinitis, with which are associated dimness of vision, the sensation of spots floating before the eyes, etc. The following report shows that recovery may follow serious retinitis:

Mrs. B., primipara, aged forty, twin pregnancy. During pregnancy had serious toxæmia, the chief symptoms being headache, disorders of vision, albuminuria and œdema. On second day after labor had a convulsion, recovered consciouness in ten or twelve hours. Could distinguish light from darkness but had no further vision. Examined by Dr. Maclennan on fourteenth day after convulsion. Report: Retina œdematous, numerous scattered flame-shaped hæmorrhages extending over the whole

retina, but smaller toward the periphery. Optic disk swollen, outline indistinct. Patient can count fingers and see letters, but not read them. Photophobia. Report of examination on thirty-fifth day: Can read and see well, although there is still some photophobia. Œdema of the retina has subsided. Disk distinct. Hæmorrhages absorbing and decolorizing.

Other Symptoms.—Other symptoms which may be mentioned are increased arterial tension, headache, sleeplessness, dizziness, vomiting, anæmia, and convulsions.

Prognosis.—Chronic Bright's disease is, of course, very serious at any time; and, unfortunately, is generally greatly aggravated by pregnancy. This is especially the case when a more or less acute tubal nephritis is added to the preexisting interstitial nephritis. I have referred to some of the dangers of nephritis of pregnancy. Among others that I have not mentioned are various forms of paralysis which may be produced by rupture of a cerebral vessel or as a result of uræmia, such as paraplegia, hemiplegia, and facial paralysis. The dangers are increased in every way when the patient is half starved by being placed on an exclusive milk diet. There may be some excuse for prescribing this diet in the acute disease. It may do good if continued for only a short time. I desire to express a very positive opinion that a pregnant woman with granular kidneys requires good food.

In chronic nephritis of pregnancy abortion, or premature labor with a still-born child, is very apt to occur. This is generally due to the prior death of the fœtus or child. In a certain proportion of cases, however, the child is born alive and well. Ordinary acute nephritis may occur during pregnancy, but not so frequently as supposed by some. With all forms of nephritis there is associated grave danger to the fœtus. In a certain (rather small, I think) proportion of cases, acute nephritis may be transformed to one of the forms of chronic nephritis.

Pregnancy in a woman suffering from chronic nephritis should always cause anxiety; not because the disease of the kidneys is likely to cause eclampsia, but because the pregnancy is likely to increase the perils to which the patient is exposed from the presence of nephritis.

Should abortion be induced in a patient with chronic nephritis? This question is frequently asked, and the answer given by some is —yes. My own answer is—no. I am fully aware that in giving

such an answer I am assuming a serious responsibility; but at the same time I am acting under a firm conviction that this very serious operation, involving as it does the deliberate destruction of a human life, should never be performed unless the mother's life is absolutely and immediately endangered. The following case will illustrate my position:

Mrs. A. Seen in consultation with Dr. W. P. Caven in May, 1895. Pregnant. Advanced two months. Attended in confinement a few years before by the late Dr. Carson. Had eclampsia. After a very serious illness, recovered, but with chronic Bright's disease (I do not know when contracted). In her next pregnancy Dr. Carson, a most competent obstetrician, induced abortion, at the same time telling her that it was impossible to go through pregnancy. After considering the case, with this history and with serious symptoms of toxæmia, including albuminuria and casts, we induced abortion. Saw her again in February, 1896. Pregnant a little more than two months. Had albuminuria and some other symptoms of toxæmia. Decided to put her on purgative and tonic treatment and to watch carefully. Dr. Caven carried this out, and patient got on fairly well. Was present at labor, August 6th, for the purpose of assisting in case of accident. Normal labor with delivery of a healthy child.

In this case I gave certain advice with considerable reluctance and much fear and trembling. In carrying out a line of treatment to a large extent in the interests of the unborn child it is necessary to proceed with the greatest possible care, and at the same time watch the effects on the patient. If serious symptoms do not appear the patient may be allowed to go on to full term; if in spite of our well-directed efforts serious symptoms do appear and do not yield to treatment, the patient's life becomes endangered and the pregnancy must be terminated. One should not wait too long and should be careful not to allow the patient to become too much enfeebled before deciding on active interference.

Another question sometimes asked is: "Should premature labor be induced during the eighth or ninth month of pregnancy if serious symptoms arise?" I have fewer scruples about the induction of labor, but never recommend it until other treatment has been tried. I shall refer to a case which I reported to the Toronto Medical Society some years ago:

Mrs. C., aged twenty-seven. Admitted to the Burnside Hospital October 3, 1893. Supposed to be in seventh month of pregnancy. Previous

history of nephritis. Had dropsy, headache, and affected vision. Urine loaded with albumin, and containing many casts. Magnesium sulphate administered. One week after admission had two convulsions at 4 and 6 A. M. Treated with chloroform, morphine hypodermically, and chloral *per rectum*. Symptoms two days after very serious; urine loaded with albumin—became absolutely solid on heating. Examination by Dr. Hill showed numerous casts, mostly granular in character, and a diminution in urea excreted, being at one time reduced to an amount a little more than half the normal quantity. There was no dilatation of the os; cervix partly intact. Condition so low that I was afraid to induce labor. General condition improved slightly under purgative and supporting treatment. Seen by Dr. Temple, who advised induction of labor. I concurred, but decided to wait till the following morning, when I found her so much improved that I again postponed operation. She continued to improve daily until October 22d, nineteen days after admission and twelve days after convulsions, when labor commenced and progressed favorably. Babe still-born. Patient made a good recovery.

I shall give no positive opinion as to the line of treatment carried out in this case. I give the history to show that a patient in an exceedingly critical condition, under the eliminative treatment, may recover without artificial interference in terminating pregnancy.

In conclusion, it may be said that the prognosis is not necessarily bad, but the conditions involve serious dangers and require very watchful care.

Morbid Anatomy.—It is not my intention to refer in detail to the pathological aspect. In acute nephritis the kidneys are swollen with non-adherent capsules, at first dark red in color but soon becoming pale and mottled in appearance. The epithelium of the tubules and glomeruli is the seat of what is called cloudy swelling, and later of fatty degeneration, while the tubules themselves are blocked with desquamated epithelium, blood corpuscles and an albuminous exudate. The interstitial tissue is, to some extent, infiltrated with leucocytes. In chronic parenchymatous nephritis the kidneys are at first large and pale, while the tubes are filled with fatty epithelium and casts, and there is some increase of the interstitial connective tissue; later the kidneys are small, pale, with roughened surfaces and capsules more or less adherent. In chronic interstitial nephritis the kidneys are small, red in color, with granular surfaces and adherent capsules. The cortical substance is greatly reduced in thickness. The increased connective

tissue, after contraction has narrowed the lumen of the tubules, causes fatty degeneration and desquamation of the epithelium. In amyloid kidneys the organs are large and pale, while the walls of the blood-vessels are thickened and infiltrated with wax-like material.

Treatment.—In all forms of nephritis with pregnancy our chief aim should be to keep the bowels open. If I were limited to only one medicine I would certainly choose Epsom salts. There should be frequent and copious watery evacuations, especially in acute nephritis—say from two to six evacuations in twenty-four hours for acute nephritis, and one to three evacuations per day for chronic nephritis. It is better to give the saturated solution of Epsom salts, two to six drams, three times a day. Occasionally, in treating nephritis during pregnancy, it is well to administer calomel, as before directed, to be followed by saline cathartics. Do not give much calomel for certain forms of nephritis, especially the chronic interstitial form.

I shall not refer in detail to waxy degeneration, because that condition is generally added to the lesions of contracted kidneys in cases of prolonged suppuration, syphilis, or tuberculosis; it does not generally call for any treatment beyond that adopted for the chronic interstitial nephritis.

In the acute form, whether exudative or diffuse, the treatment should be prompt and vigorous. Here, the administration of calomel followed by saline cathartics, together with rest in bed, will frequently accomplish much good. The skin should be kept active with warm or hot baths, not hot packs, and perhaps a certain amount of skin friction. Applications of hot poultices, or wet or dry cups, to the lumbar region may be of service. If cerebral symptoms, due to contractions of the arteries, with labored heart action, appear, give arterial dilators, such as chloral, aconite, or nitroglycerin. Nitroglycerin, or glonoin, or trinitrin accelerates the pulse, relaxes the arteries and produces a feeling of fulness all over the body, with sometimes severe headache which may last several hours. Care should always be used in administering it, and the sad mistake of giving it when the arterioles are relaxed should never be made. I have seen such a mistake on more than one occasion; and not long ago saw a patient who was taking it while her pulse was soft and extremities almost bathed in cold perspiration. Nitroglycerin, or certain of the nitrites, especially ni-

trite of amyl, is more frequently indicated in chronic nephritis, particularly when there is uræmia accompanied with contracted arteries. Bloodletting, under such circumstances, is frequently followed by very happy results. When tension is low, with feeble heart, give stimulants such as caffeine, digitalis, strophanthus, and strychnine.

Diuretics should be used with caution. Most medicines usually included in that class should not be used at all. Water is the best diuretic in these cases and should be taken freely. It has been observed by many clinicians that small doses of calomel and blue pill frequently act as diuretics. An old-fashioned combination for dropsy is that of digitalis, squill, and blue pill. Certain of the vascular and cardiac tonics, which raise the blood pressure and which are used in certain conditions associated with nephritis, are diuretics up to a certain point; but, as pointed out by Lauder Brunton, if pushed too far they may cause contraction of the capillaries or arterioles. When this contraction occurs in the kidneys the secretion of urine may be seriously lessened or completely stopped. Such medicines as digitalis, strophanthus, sparteine, although useful, as already indicated, for weak heart with low tension, should be administered with caution. The best and safest way to help lame kidneys is to flush them with water, and act freely on the bowels with saline cathartics.

It is frequently or usually desirable to give tonics, such as quinine, strychnine, mineral acids, and vegetable bitters. Basham's mixture, or solution of iron and ammonium acetate, is so eminently respectable that I dislike to say anything against it, but I shall not advise any person to use it. I object strongly to the indiscriminate use of the various forms of iron in the different varieties of nephritis. Iron should not be prescribed when there is a foul tongue.

A few words as to diet. For acute nephritis let the patient take as little food and as much water as possible for some days. An exclusive milk diet is probably better than a mixed diet containing considerable quantities of meats and other nitrogenous foods, but I never prescribe it. The patient may choose from the following: Acid fruits, green vegetables—especially spinach and lettuce—bread, toast, rice, tapioca, sago, milk diluted with ordinary or mineral water, buttermilk, kumiss, tea, lemonade, water, mineral waters. After a time I should add fish and potatoes.

For chronic nephritis, especially interstitial nephritis, the pa-

tient may choose from the following: Limited amounts of meats and poultry, fish, oysters, apples, peaches, oranges, lemons, grape fruit, cherries, currants, etc., spinach, lettuce, cabbage, cauliflower, celery, rhubarb, green corn on the cob, carrots, bread, toast, crackers, potatoes, a little pepper, salt, and vinegar for flavoring purposes, oatmeal, corn-meal, rice, sago, tapioca, macaroni, vermicelli, and all beverages recommended for the acute disease.

The patient should avoid animal soups and broths, eggs, cheese, baked beans, asparagus, sweet potatoes, turnips, syrup, beets, honey, ice-cream, sweets; sweet fruits, such as grapes, bananas, raisins, pears, all canned fruits preserved in sugar; champagne, cider, port wine, burgundy, claret, sherry, beer, porter, all sweet wines.

The following special instructions may be given to the patient: 1, Eat in moderation; 2, keep the bowels open; 3, may eat meat or poultry three times a week; 4, may try, once a week or once a fortnight, a meal without any restrictions as to quality of food, but still eating in moderation. At the same time avoid foods which in the past have disagreed with the patient.

Surgical Treatment of Nephritis.—According to Reginald Harrison, the hæmaturia, pain, and suppression of urine, which sometimes occur in nephritis, are due to tension within the tough renal capsule. This tension occasionally leads to a slow extravasation of urine into the renal tissue, which is highly destructive. To relieve such tension he performed a nephrotomy—either puncture or splitting of the kidney. For the same purpose Edebohls performed a renal decapsulation—removing the fibrous capsule of the kidney. Primrose, Peters, and Fenton, of Toronto, have also performed this operation. The results have been fairly encouraging. Some surgeons think that the removal of the capsule, which is a barrier to collateral circulation, promotes a free flow of blood through the kidney. In consequence the increased interstitial tissue is absorbed, pressure on tubules is removed, and a regeneration of the renal epithelium takes place.

DISEASES OF THE BLADDER

Irritability of the Bladder.—This is very common, especially in the early months of pregnancy as the uterus enlarges. The unpleasant symptoms connected with this condition generally be-

come less annoying about the fourth month, although more or less frequency of micturition is common during the whole of pregnancy. In the latter eight or ten weeks the uterus has so greatly increased in size that the posterior wall of the bladder, which is in close connection with the anterior surface of the uterus, is drawn upward so far that the shape is greatly changed, being elongated and flattened. Under such circumstances the squeezing of the bladder between the abdominal wall and the anterior uterine surface is so great that frequency of micturition is almost always present, and sometimes is so extreme as to cause great discomfort with impairment of health.

Cystitis, or inflammation of the mucous membrane lining the bladder, is rather common during pregnancy. Retention of urine, especially when due to retroversion of the gravid uterus, is probably one of the most frequent causes of cystitis. It is, of course, well known that catheterization for the retention is quite likely to produce very serious cystitis when antiseptic or aseptic precautions are not used. Gonorrhœa in its various forms, acute, subacute, and latent, is probably more frequently a cause of cystitis than is generally supposed. From these various causes—probably mostly from the different forms of pressure of the enlarged, and sometimes displaced, uterus—very severe cystitis is sometimes present. As pointed out by Herman, it may go on to sloughing and exfoliation of the whole vesical mucous membrane; or it may produce gangrene of the vesical wall at one spot, having as its result perforation of the bladder. Irritability of the bladder may also be caused by reflex or sympathetic influences.

Treatment.—In speaking of the treatment I shall refer to all forms of irritability, including cystitis. I regret that some authors have taken the position that as these troublesome affections are not preventable they must simply be endured, because no appropriate treatment is possible. The tendency of such teaching is to make us fold our hands and lapse into hopeless negligence or incompetency. In a large proportion we may do much to relieve, in all cases we may do something to diminish suffering. Remember, in this connection, that many women, especially in their first pregnancies, hesitate long before consulting a physician and explaining in detail their ailments. By all means encourage them to tell everything, and discover all you can and then do what you can to cure or alleviate their suffering. Bland mucilaginous drinks, such

as flaxseed tea, should be freely given, displacements of the uterus should be corrected and constipation thoroughly treated.

Skene's prescription is suitable for all forms of irritability or subacute or chronic cystitis.

℞ Acid. benzoic ..... ʒiv;
Sod. bicarb ..... ℥ss.;
Sacch. alb ..... ʒiv;
Spt. limon ..... gtt. v.
Sig.: Triturate. A teaspoonful in water every three or four hours.

The following may be used:

℞ Sod. borat } ..... āā gr. x.;
Acid. benzoic }
Infus. buchu ..... ℥i.
Sig.: One dose. Take four times a day.

Benzoic acid alone is not soluble in these proportions, but when mixed with the sodium borate a decomposition takes place which makes it soluble. However, while soluble in one ounce of the infusion, it would not be so in half an ounce.

Although tincture of hyoscyamus and liquor potassæ are incompatible, this old-fashioned mixture frequently has a good effect.

℞ Tinct. hyoscyami } ..... āā ʒiv;
Liq. Potassæ.... }
Aq. ad. ..... ℥ij.
Sig.: A teaspoonful in milk three or four times a day.

If pain is very severe from acute cystitis give 15 minims of the tincture of opium in infusion of linseed freshly prepared. To each small cup of this add 20 to 30 minims of liquor potassæ.

In chronic cystitis certain medicines have a marked effect on the character of the urine. Boric acid is one of the best. When given in 15-grain doses in a glass of water or milk three or four times a day it frequently has a marked effect. Urine which is ammoniacal and highly offensive may be so changed in forty-eight hours or less that it is voided clear and entirely free from smell. After some days the dose may be diminished to 5 grains three times a day. Sometimes, unfortunately, it irritates the stomach and destroys the appetite. Urotropine, dose 5 to 15 grains (.32

to 1 gm.) three times a day, is valuable as a urinary antiseptic. A convenient form is the effervescent urotropine 4 grain tablet (Varalette).

In obstinate cases local treatment may be necessary. General applications may be made to the whole interior of the bladder through a catheter, or limited applications may be made through the endoscope. Washing out the bladder with sterile warm water often answers a good purpose.

Incontinence of Urine.—This condition may be treated by the use of the abdominal belt, by giving tonics (belladonna, strychnine, etc.) and by advising the patient to take a moderate amount of fluid.

Retention of Urine.—This is caused by retroversion of the uterus in the early part of pregnancy and cystocele in the later part. Another cause is reflex contraction of the neck of the bladder. The treatment is catheterization, with the most scrupulous aseptic and antiseptic precautions.

Diabetes.—A patient with diabetes may conceive and pass through pregnancy with comparative safety. There is, however, always some danger for the mother and great danger for the child *in utero*. The mother frequently dies shortly after labor. The fœtus generally dies early in pregnancy. Diabetes may occur only during pregnancy and disappear after labor.

Glycosuria occurs in 2 to 4 per cent. of pregnant women. Two kinds of glycosuria are found:

1. When the sugar is lactose.
2. When the sugar is glucose.

Lactosuria is by far the more common variety, and is not likely to cause serious symptoms.

Treatment. Carry out the usual medicinal and dietetic treatment.

Empty the uterus in extreme cases.

GENERAL TOXÆMIA OF PREGNANCY.

Toxæmia of pregnancy is a general poisoning of the system by toxines resulting from imperfect elimination, due to defects in the intestines, liver, kidneys, and perhaps other organs.

Ordinary health is a very precarious and uncertain thing. To-day one is well; to-morrow one may be sick, with perhaps a head-

ache, a furred tongue, and a high temperature. The cause may be from without or it may be from within. Assimilation may have gone wrong; secretion and excretion may have lost their balance; poison of some sort may have come into existence and may be retained; it may be a bilious attack—whatever that is—or it may be something much worse. The equilibrium of health appears to be more easily disturbed during pregnancy than at other times.

Modern views as to toxæmia of pregnancy are based chiefly on the observations of Bouchard, who published in 1887 his "Leçons sur les Auto-intoxications." He expressed the opinion that even in health the blood and other tissues of the body contain toxic substances of various kinds, partly introduced with the food and partly produced within the body itself by digestive processes and tissue metabolism. He thought the condition of health depended upon a properly balanced adjustment of the production and excretion of these toxic substances. When this balance was lost, increase of production, or diminution of excretion of toxines, or both, produced a condition of toxæmia or auto-intoxication. It was supposed that this theory if correct would be readily capable of experimental proof. A large amount of experimental work was done with this end in view, especially in France, but also in other parts of the continent.

An admirable critical review of the evidence furnished by the large amount of the experimental work which has been done up to 1902 has recently been published by Eden. He expresses a positive opinion that proof of this theory has not been obtained, and never can be obtained, by the methods of investigation hitherto adopted. He also thinks that very little further can be done until physiological chemistry can separate definite toxines from the blood. He practically tells us that normal pregnancy is not accompanied by any condition of the blood that can readily be called toxæmia. In this respect I entirely agree with Dr. Eden. I have thought for many years that all our considerations of pregnancy and labor in a healthy woman should be from a physiological rather than from a pathological standpoint; but we should recognize as a fact that in a certain minority of cases diseased conditions may arise and may affect the woman more or less seriously. Such a view, it seems to me, corresponds exactly with our clinical observations and partly, at least, with our post-mortem evidences.

Without any further discussion of this subject, I shall assume

that some women during pregnancy are affected by certain diseased conditions which are included under the rather vague term of toxæmia. As a consequence, there exists one or more poisonous substances called toxines which produce serious effects in many of the organs and tissues of the body, and perhaps to some extent in all the organs and tissues of the body. These offending toxines are found chiefly in the blood, liver, and muscles. It is probable that the liver and intestines are mostly at fault, but in a certain proportion of cases insufficiency or inefficiency of the kidneys is a serious element in the disturbance.

Symptoms.—There can be no doubt as to the great importance of the earliest possible recognition of the toxæmia of pregnancy. The chief *symptoms* are: salivation, disorders of digestion, general malaise, anæmia, nervous disturbances with headache, disorders of vision, etc., deficient excretion of urine, or some of its constituents (as, for instance, urea), albuminuria, œdema, especially of lower extremities, high arterial tension.

Any symptoms of the slightest departure from ordinary health during pregnancy should make us suspect the advent of general toxæmia, and should receive careful investigation and thorough treatment. If, for instance, there is general malaise with slight headache, but no albumin in the urine, one should not conclude that there is no toxæmia, since albuminuria is only one of the symptoms of systemic poisoning and sometimes the last to appear. Its absence proves absolutely nothing. The following history of a case will illustrate what I mean:

About ten years ago I attended a patient, aged twenty-three, primipara, somewhat anæmic, though she had been fairly healthy. No serious symptoms arose during pregnancy until the ninth month, when she appeared to be slightly ill, had some malaise, a little headache for two or three days, and slight indigestion. Found no trace of albumin after examining three specimens of urine, one the day before labor. She had no headache the morning before labor but seemed rather weak. Labor progressed favorably through first stage, when suddenly, to my amazement, convulsions occurred. Delivered immediately with forceps under an anæsthetic. Expressed placenta at once. Very little hæmorrhage. Patient very low. Pulse rapid and flickering. Had the greatest difficulty in keeping her alive for next twelve hours; frequently thought she was dying. After twelve hours she commenced to rally, gained strength rather rapidly, and made a good recovery. Urine examined next day and found to have a trace of albumin, which soon disappeared. Child

did well and is now living and healthy. This patient had, I think, serious toxæmia (without albuminuria or any sign of insufficiency of the kidneys), which I did not properly appreciate nor judiciously treat.

I have for years tried to emphasize the point that any slight disorder, such as indigestion, malaise, headache, in the last three months of pregnancy, should be considered a serious matter and should necessitate a very careful and thorough examination and generally some vigorous treatment.

It is well known that our matron in the Burnside is careful and watchful. Last year I was called to see a patient with eclampsia occurring at about full term but before labor. I was told the patient had been going about the ward as usual without any preliminary symptoms whatever. Finally I asked this question: "Has this girl had no headache during the last week?" I was then told that she had a slight headache the day before but was better that morning. It happens that our patients in this institution frequently avoid telling about slight ailments, such as headache, for fear of having to take medicines or, what many of them dread more, of having their diet restricted.

In a large number, if not in all, cases of toxæmia of pregnancy the amount of urea excreted is diminished. In the urine of pregnant women without complications the amount of urea varies from $1\frac{1}{2}$ to 2 per cent. An amount less than 1 per cent. generally indicates certain dangers; why this is so I do not know. We have no direct evidence to indicate that the urea produces any of the unfavorable symptoms, but clinical observation shows us that diminished ureic excretion should always be considered a danger signal, possibly because the urea furnishes a standard of the excretion of other much more toxic bodies in the urine.

Although we should not give too much prominince to albuminuria, yet we should always consider it a very serious and, from various points of view, a very important symptom. It is especially serious when it appears suddenly in the last three months of pregnancy. It is also well to remember in connection with albuminuria that there are two varieties of precipitate, as pointed out by Herman. It is thought by some that this is a matter of such importance as to form in certain instances the best guide to prognosis. The two forms of precipitate are paraglobulin and serum albumin. According to Herman's ideas, if the albumin is principally paraglobulin the recovery may be predicted if judicious

treatment is carried out, the patient generally recovering without any ill effects. When, however, serum albumin predominates the prospects for recovery are much less favorable. It is not an easy matter to separate and estimate the quantities of these two different sorts of precipitate. According to Dakin the following is the best test. Treat the urine with a saturated solution of magnesium sulphate; or better, saturate the urine itself with the salt. This precipitates the paraglobulin only. The mixture is then filtered, and the residue washed with a saturated solution of the salt. The paraglobulin remains on the filter; and the serum-albumin, still in solution, is in the filtrate. This last can be precipitated with heat or nitric acid. The residue on the filter is dissolved in warm, distilled water, and precipitated again by heat or nitric acid. The relative quantities can then be compared.

Œdema.—This dropsical condition, whether confined to the lower limbs or not, causes fear in the minds of the doctor and patient. Let us consider the matter from a clinical standpoint. One patient has œdema of the ankles; otherwise she has no serious symptoms and feels well. It is ascertained by verbal examination that the patient had absolutely no subjective symptoms of a serious character. The swelling of the feet and ankles is worse in the evening, being very slight if not altogether absent before getting out of bed in the morning. There is reason to think in such a case that the œdema is simply due to pressure of the gravid uterus, which prevents a free return of the blood from the lower extremities. It is easy to understand why the swelling should be worse after walking around through the day than it is in the morning after resting in the recumbent posture. To leave this patient without further investigation, notwithstanding the fact that the favorable opinion formed is probably correct, is wrong. One should not take it for granted that this œdema is a trifling matter until he has exhausted all means of investigation. One or more examinations of the urine should be made in every instance of this sort.

Another patient has swollen ankles; has no other serious symptoms excepting that she gets tired easily; has no valvular disease of the heart, though palpitations are common; is pale and her lips are almost white. The condition is probably due to anæmia and hydræmia, but again one or more examinations of the urine and also of the blood should be made.

Another patient has a similar swelling which has occurred early in pregnancy, perhaps the second or third month. She was well before pregnancy, but now, in addition to the œdema, she has other slight symptoms, such as disordered digestion, headache, etc. One should suspect acute nephritis; an examination of the urine will probably confirm such suspicion. In another case these symptoms may appear in one who has had chronic nephritis before. One should study the case carefully in accordance with the directions already given with reference to the different forms of nephritis. The probable causes of such œdema and accompanying symptoms are: Preexisting kidney disease; that is, chronic nephritis, chronic nephritis with the condition of acute nephritis added, acute nephritis, pressure of gravid uterus, changes in blood and heart, reflex disturbance of the circulation.

TREATMENT OF TOXÆMIA

In speaking of the treatment I shall first refer to diet. What is the best diet? Tarnier and Charpentier many years ago told us that milk, and milk only, was the proper food. The whole obstetrical world accepted their dictum without any reservation and for many years followed their advice. At the same time physicians, as well as obstetricians, approved of milk as food in many diseased conditions. In my student days I had typhoid fever, and I can well remember how much I suffered for some weeks in consequence of having to take a food that I always disliked. Early in my practise, however, notwithstanding my sad personal experience, I was still orthodox on the milk question. I shall refer to one case of long continued fever, which I attended about twenty-two years ago. For three long months the unfortunate patient got nothing but milk. He protested against such food at times, but I remained orthodox. I was also particularly cautious, according to our lights in those days, in avoiding as far as possible the administration of cathartics. At the end of three months we found a serious condition of things. The lower bowel was crammed full of material very like hardened plaster, such as we have on our walls. Enemata of soap-suds and olive oil had about as much effect as though they were forced against a stone wall. We had to scoop out the mass in the rectum with a spoon; sometimes we had to fairly drill it out. Shortly after this I found that milk diet was the worst that could be devised in cases of perinæorrhaphy and other operations in the

region of the rectum. My experience in connection with these and many other cases was so unsatisfactory that I modified my lines of treatment to such an extent that I have not compelled any patient to take an exclusively milk diet for fifteen years.

Milk Diet for Toxæmia or Albuminuria of Pregnancy.—In speaking of milk diet I do not wish to denounce it altogether; I believe that a purely milk diet is good for young children and calves, but I do not think it is suitable for adult human beings. We have been told over and over again to avoid nitrogenous foods in the albuminuria of pregnancy, but we must remember that milk contains many nitrogenous substances. Yeo, in his admirable book on Food in Health and Disease, shows clearly that milk alone is not a suitable food for healthy adults, because it contains an excess of albuminates and fats, and that it should be mixed with other foods, especially the carbo-hydrates. If it be conceded that milk alone is not the best food for healthy adults it is difficult to conceive how it can be the most suitable in any case of disease.

I have no objection to milk in a mixed diet. It is certainly good food in combination with other things. It is well to remember that some of its modifications, like buttermilk and kumiss, are frequently more useful, because more easily digested, than plain cow's milk. The following dietary is what I have prescribed in private practise and in the Burnside Lying-in Hospital for the last ten years. Milk, buttermilk, kumiss—as much as the patients care to drink, but no more; plain water in abundance; tea once a day if desired; cocoa, lemonade, mineral waters, etc.; bread (not too fresh) and butter, dry toast or cold toast and butter; rice, tapioca, arrowroot, etc.; fish without rich gravy; limited amount of white meat and raw oysters; limited amount of salt; vegetables of all sorts, restricting, however, the supply of potatoes, and encouraging the use of greens, such as lettuce, spinach, watercress, etc.; ripe fruits, such as oranges, bananas, and grapes—other fruits cooked, such as apples, pears, and peaches.

I advise the patients to choose what they please from this list, and take especially the things that appear to agree best with them. I desire them to gratify as far as possible the cravings of their stomachs and to eat too little rather than too much. The majority of patients suffering from toxæmia in the Lying-in Hospital take little or no milk. In my private practise the majority of such patients take a certain amount of milk. A large number also take mineral

waters, especially Hunyadi Janos or a mixture of Friedrichshall and Carlsbad. Milk diluted with such waters as the so-called soda, or Apollinaris, or Sprudel, or Vichy, is well liked by some. In connection with the above list of foods I ask the patients not to take both milk and fish or meat at the same meal. During the last two or three years I have in certain cases added eggs and some of the heavier meats, such as beef, mutton, and bacon, to the list.

Among the articles which should be avoided are hot bread and cakes, pastry, highly seasoned dishes of all kinds, spices, cheese, nuts, rich gravies, and dried foods.

Medicinal Treatment.—The following is the routine treatment carried out in the Burnside. As soon as symptoms of toxæmia arise the patient is required to take calomel, 2 to 5 grains in one or in divided doses—say ½ to 1 grain doses every half hour for four or five doses, to be followed by Epsom salts, ½ to 1 ounce in one-half hour, and thereafter 2 to 4 drams every hour until a free evacuation takes place. An enema is also administered, immediately after giving the calomel in urgent cases—i. e., when the symptoms are severe, especially when there is a large amount of albumin in the urine and a small quantity of urea excreted. In less urgent cases a few small doses of calomel (say ¼ of a grain every half-hour for six doses) are administered, to be followed by the salts. After the bowels are freely opened smaller doses of salts are given, sufficient to produce not less than four watery evacuations in each and every twenty-four hours. For the first few days I do not object to twelve motions in twenty-four hours. When bad symptoms, including albuminuria, disappear or become less severe, we stop the administration of salts for a time, but we endeavor to prevent anything approaching constipation, and desire not less than two evacuations of the bowels every day until after labor. I carry out the same rules in private practise, but I do not as a rule tell my patients that I am giving simply that common, old-fashioned stuff—Epsom salts. I frequently give the following prescription after a short course of free purgation:

℞ Magnesii sulphatis ..... ℥ ij;
Acidi tartarici ..... ʒ iij;
Tincturæ cardamomi compositæ ..... ʒ ij;
Aquæ ad ..... ℥ iv.

A dessertspoonful in hot water three times a day.

I give the tartaric acid because it disguises the taste of the salts to such an extent as to make it quite or almost palatable for the majority of patients. In hospital practise I prefer to give the concentrated solution alone. While I desire such patients to drink as much water as possible at all times, I consider it especially important that they do so during the free purgation.

What does magnesium sulphate do? It removes noxious elements which would otherwise be absorbed from the intestinal canal. It removes from the blood a large quantity of serum and with that serum a certain proportion of the "circulating toxins" without at the same time abstracting the blood corpuscles. It aids the liver and kidneys, which without such assistance soon become seriously diseased from the effects of poisoning and overwork. It does away to some extent at least with the necessity of bleeding or administering veratrum viride if convulsions occur.

Some object to the long-continued use of cathartics. A prominent American obstetrician once said in my presence, "A woman can not be purged for two or three months." In reply I have only to say a woman can be purged for two or three months in the way I have indicated. I have seen it done in many instances. Others object because, as they say, such treatment tends to produce anæmia. In reply to that I wish to express a very decided opinion that it does not tend to produce anæmia. On the contrary, it in many cases somewhat rapidly improves the condition of the blood by removing from the body the poison which is, to a large extent, producing the anæmia. Some years ago I was rather timid about pushing such treatment vigorously in patients that were weak and anæmic, but my scruples in that respect have ceased to exist, because I have never seen it produce an evil effect. Of course, one should use ordinary good judgment, watch carefully the results, and act accordingly.

It must be acknowledged that Charpentier, one of the strongest advocates of an exclusively milk diet, had remarkably good results in his treatment of albuminuria of pregnancy. So had Tarnier and others. But many had not. Pajot thought it perfectly useless. Such direct contradictions, which are not rare in connection with many phases of this very important subject, are perplexing. I think, however, that Charpentier's success was not due, as he thought, to his dietary, but to the fact that apart from that he carried out exactly the principles of treatment which I have

described. He made "use of purgatives in a repeated and constant manner," and tried "to obtain, by means of purgatives, a serous intestinal discharge which withdraws from the woman a large quantity of serum, etc." He preferred the "saline purgatives." "In a word, we try to produce a revulsive effect on the intestines." He got good results from free and continuous purgation with a certain diet. I have had and seen at least equally good results with free purgation and a diet that he strongly condemned. I think it fair to conclude that the purgation was the important element in the success in both instances.

The Kidneys and Diuresis.—In a certain proportion of cases the excretion of urine is normal or excessive in quantity; in either case, of course, diuretics would not be indicated. In other cases the quantity excreted is much reduced, rarely total suppression occurs. When the quantity is scanty many are tempted to give diuretics. Administration of the ordinary diuretic medicines under such circumstances is generally, if not always, harmful. There is just one diuretic that I should recommend in these cases, and that is plain water. Dickinson taught us many years ago that in a large proportion of cases of kidney disease plain water is the best remedy. (Some use distilled water.) Dickinson, in giving such recommendations, was referring especially to the effects of congestion or, more properly, inflammation. We may accept Leyden's theory as to the toxæmic kidney and consider that in such the condition is one of anæmia rather than congestion, but we must remember that the toxines, or their effects, are found in the kidney substance and the tubules, and our aim should be to flush out these organs with the simplest dilutent diuretic at our disposal, that is, water. I had supposed that there was a general consensus of opinion as to the value of water for all sorts of lame or diseased kidneys, excepting when some such condition or disease as glycosuria or diabetes is present. I find, however, that a few obstetricians, including Byers, recommend the withholding of liquids in toxæmia and especially in eclampsia. I hold a very decided opinion that the ingestion of liquids (especially plain water) is beneficial in both these conditions. It may be that nitroglycerine may sometimes act as a safe diuretic by overcoming the spasm of the renal arteries which causes that anæmia described by Leyden.

Skin and Diaphoresis.—Many who believe in the elimination treatment of toxæmia and eclampsia attach a great deal of impor-

tance to the proper action of the skin. I am quite in sympathy with such ideas, but I object to what may be called the aggressive method sometimes employed. I have not found much benefit from any ingenious machines or devices designed to cause profuse perspiration; I have, in certain cases, found great prostration follow some of these sweating procedures. I dislike, therefore, to see the patient suffering from toxæmia of pregnancy either cooked, baked, or parboiled. I think, at the same time, that every pregnant woman, whether toxæmic or not, should have a daily warm bath. In speaking of the treatment of eclampsia I shall refer to some of the simpler devices which may be of some service. I shall simply add now that beyond systematic bathing nothing is required except sufficient warm clothing with woolen fabric next the skin. Of course, I accept the dictum of our therapeutists that the kidneys and skin have functions which are complementary to each other; as a consequence, when one is doing a diminished amount of work the other has to do a great deal. It seems right, therefore, when the kidneys become lame, to make the skin do more work. But very little tissue waste is, under any circumstances, eliminated by the skin. As clearly pointed out by Sir Lauder Brunton, the skin acts chiefly by eliminating water and by regulating temperature through the evaporation of this water. Sometimes a certain amount of urea may be found in the sweat, but, generally speaking, the amount of solids eliminated by the skin is exceedingly small.

Administration of Thyroid Extract.—It is supposed by some, who think that the most important point in the treatment is to secure elimination by the kidneys, that there is an intimate relationship existing between thyroid function and renal sufficiency. According to their views, inadequate thyroid action causes diminished secretion of urine with high pulse tension and œdema of a more solid character than that of ordinary dropsy, more of the myxœdematous (Nicholson) nature. In such cases, it is said, a patient will derive benefit from taking thyroid extract, a 5 grain (.32 gm.) tablet twice or three times a day.

As I believe the best means of eliminating the toxines is through the intestinal canal, the thyroid treatment does not appear to me to be founded on correct principles, even though it were true that the thyroid gland and kidneys are to some extent complementary in their functions. The results from animal organotherapy have come very far short of fulfilling expectations. However, the thy-

roid preparations appear to have undoubted value, especially in myxœdema and goître, and I sometimes give the extract when a patient has the hard myxœdematous swelling and scanty urine, with or without the high tension pulse. One should be cautious in the use of this remedy because it may reduce the patient's strength out of all proportion to the benefit derived.

I saw with C. H. Britton recently a patient who had serious toxæmia of pregnancy. There was œdema of legs, vulva, and lower portion of abdominal walls. The swelling of legs and thighs appeared to be myxœdematous in character. Treatment: Free catharsis and thyroid extract gr. iii (.17 gm.) three times a day. No improvement in symptoms. Labor one week after I saw her; living child; good recovery.

Induction of abortion or premature labor is considered in another chapter.

ECLAMPSIA

The word puerperal, as applied to eclampsia, is of course a misnomer. Eclampsia, as we now understand it, is the term applied to suddenly occurring tonic and clonic convulsions of the whole body of the pregnant, parturient, or lying-in woman, such convulsions having associated with them complete loss of consciousness. In accordance with this definition we exclude the convulsions of epilepsy and hysteria and also certain cerebral lesions which may occur as accidental complications.

Eclampsia is due to toxæmia and therefore its causes are those of toxæmia. The important cause, as before stated, is the accumulation of toxines within the body, the liver, intestines and kidneys being chiefly at fault. In addition certain obscure changes take place in the nervous system. We do not know the character of these changes, but we surmise from clinical observation that there is extreme irritability of the nerve centers, causing them to become explosive at certain critical periods.

Frequency.—Eclampsia is said to occur once in 500 labors. There seems, however, to be quite a difference in the statistics coming from different countries. The rates given in various parts of the continent vary from about 1 in 300 to 1 in 650. The frequency in Great Britain is about 1 in 360; the frequency on this continent is, I think, about 1 in 350.

The premonitory symptoms are: Salivation, disorders of di-

gestion, general malaise, anæmia, nervous disturbances with headache, disorders of vision, etc., deficient excretion of urine or some of its constituents (as, for instance, urea), albuminuria, high arterial tension, œdema, especially of lower extremities.

These are the actual symptoms of general toxæmia, and are repeated here because of their importance. The following are the actual symptoms of a convulsion. The first thing noticed is generally a twitching of the eyelids, the face being at the same time pale; spasms of the muscles of respiration soon occur, at the same time the head is generally drawn to one side, the eyes are turned inward, and the face gets dark in color; the thumbs are generally turned in. This is the commencement of the tonic stage during which the patient lies with all her muscles rigidly contracted.

Next come the clonic spasms. Twitching begins at the face and eyes and extends to more violent jerking movements of the head and neck and of the limbs. The face becomes still more cyanosed and greatly disfigured; in fact the disfigurement amounts to a horrible distortion which transforms a face, no matter how beautiful it may be, into something indescribably repulsive, requiring to be seen before it can be fully appreciated. The tongue is protruded and often bitten. Foam stained with blood pours out from the mouth, while the breath escapes with a hissing sound.

In giving this description I have followed Galabin closely, but the description will not fit all cases. In some cases the fits begin with twitching of the face and eyeballs, while the tonic and clonic spasms of the muscles of the limbs seem to alternate. Sometimes no clear distinction can be made between the tonic and clonic stages, especially when the fits succeed each other rapidly. Sometimes in tonic spasms the back may be arched as in opisthotonos. The patient is completely unconscious during the convulsions. Urine and fæces may be passed. A single fit lasts, on an average, from one to one and a half minutes. It is generally followed by deep sleep with stertorous breathing. When the fits are frequent the patient does not recover consciousness during the intervals. In mild cases—that is, when there is only one fit, or a few fits at long intervals—consciousness may return after the single fit or during the intervals, but the patient has no remembrance of what has occurred and is always more or less confused.

I have a patient who some years ago had four convulsions with complete loss of consciousness during their continuance, who to-

day has not the slightest idea that she ever had a fit. In some of these cases, even while the patient is unconscious, reflex sensibility is shown when the labor pains occur or when she is touched, as, for instance, during a vaginal examination. The sensibility of the pupils to light is generally diminished. They may be dilated or contracted, but generally are contracted shortly before and during the paroxysm. Braxton Hicks thought that the uterus, at least sometimes, took part in the paroxysm and that in many cases the uterus may be felt to harden immediately before the convulsions come on. In other cases the paroxysm may induce a tetanic contraction of the uterus lasting several minutes longer than an ordinary labor pain. Spiegelberg, however, does not agree with these conclusions.

As an effect of the repeated convulsions the pulse becomes rapid and sometimes small. The rate is frequently from 120 to 140. Galabin tells us that from sphygmographic tracings, taken during the eclamptic state, he has found that the pulse is not a dicrotic pulse with low tension, like the ordinary rapid pulse of fever, but one of abnormally high tension like that observed in Bright's disease. In certain cases, when the fits recur at short intervals, the temperature may rise to a very unusual height, some say as high as 108° or 109°.

Diagnosis.—The diagnosis of eclampsia is generally easy. The diseases from which it must be especially distinguished are epilepsy and cerebral disease, as these are the only two diseases, outside of eclampsia, in which fits occur with total loss of consciousness. As to the first we can generally learn from the history that epilepsy has existed previously. In cerebral disease, such as hæmorrhage, there are generally signs of paralysis; and in meningitis fever has existed previously. We may also require to distinguish it from hysteria, coma, and drunkenness. In hysteria there is never complete loss of consciousness nor the extreme respiratory spasm which exists in eclampsia. In cases of drunken delirium we may diagnose the condition from the history of the case and from the alcoholic odor of the breath.

Eclampsia occurs much more frequently in primiparæ than in multiparæ, the proportion between the two being as 80 per cent. to 20 per cent. According to Vinay, its frequency in primiparæ is due to the slowness of labor, the increase of intra-abdominal pressure owing to the inextensibility of the parts, the too early

engagement of the head which compresses the ureters, the greater frequency of albuminuria, and to the far greater reflex excitability. Elderly primiparæ are especially liable. Multiparæ are most frequently affected in the second or third pregnancy. I think it is not generally understood that a recurrence of eclampsia in a second pregnancy is rare, probably not occurring in more than 2 per cent. of the cases. It would seem from this that one attack of eclampsia confers immunity to a greater or less extent in subsequent pregnancy.

Prognosis.—The mortality both to the mothers and babes from eclampsia is high, probably about 25 per cent., being especially high in patients attacked before labor. The prognosis as far as the mother is concerned is perhaps best indicated by the number of the fits. It is hard to give any definite number, especially as death may result from one convulsion, particularly if cerebral hæmorrhage or pulmonary fat-embolism occurs. However, I am inclined to agree with Dührssen, who thinks that when there are more than ten fits the prognosis is bad. Rosenstein, however, reports one case of recovery after eighty-one fits.

Morbid Anatomy.—Post-mortem examinations have not cleared up doubtful points in pathology as satisfactorily as one might have expected. In giving a few notes as to morbid anatomy I shall follow Jellett. He tells us that in post-mortem examinations made on women who have died of eclampsia we find a series of more or less constant morbid conditions, but nothing which can be regarded in the light of a primary lesion.

The liver is more yellow in color than usual, due to commencing fatty degeneration or varying lesions of the epithelium (Pilliet). Small hæmorrhages are met with both beneath the capsule and in the liver substance, and also areas of necrosis round the portal spaces, from which emboli—of fat (Virchow)—of liver cells (Jürgens) may be carried to other organs.

The kidneys are diseased in from 90 to 95 per cent. of cases. The commonest condition found is that known as the pregnancy kidney (toxæmic). Chronic nephritis is more rarely present. Minute areas of necrosis resembling those met with in the liver are found distributed around some of the convoluted tubules. In a very small proportion of cases the renal changes may be attributed to the effects of obstructive suppression of urine due to pressure upon the ureters. The spleen is enlarged, congested, and soft.

Areas of necrosis, as in the liver, are met with, and small hæmorrhages beneath the capsule and in the spleen substance (Bouffe de Saint-Blaise). The pancreas also presents areas of necrosis and may be very anæmic.

The brain is sometimes hyperæmic, sometimes anæmic, and somewhat œdematous, with consequent softening of the convolutions and showing minute hæmorrhages in various parts. The lungs are usually œdematous, especially at their bases; subpleural ecchymoses are seen, and emboli are found which may come from the liver. Changes have been met with in the liver and kidneys of the fœtus resembling those which occur in the mother. The placenta is frequently the seat of white infarction, and it is thought that from these areas placental giant-cells may pass into the blood.

Causes of Death in the Mother and Child.—According to Clifton Edgar, the causes of death in the mother are: exhaustion; apoplexy, from forcible rupture of the cerebral vessels; asphyxia, due to spasm of the muscles of the glottis and of respiration; pulmonary and cerebral œdema, the result of serous effusions from distended capillaries; cerebral congestion, of which coma is a symptom, and paralysis of the heart. The last when it occurs in the general spasm causes instant death. The causes of the death of the child are: the mother's convulsions and the pressure exerted by them; asphyxia, from compression or œdema of the placenta, or the excessive carbon dioxide in the blood, and possibly direct poisoning by the toxic material in the maternal circulation.

TREATMENT

The opinions of leading obstetricians in various parts of the world respecting the treatment of toxæmia and eclampsia are so many and so diverse that it is difficult or impossible to do full justice to the subject in the space at my disposal. It is well to take a broad view of the subject and avoid narrow ideas as to the superexcellence of any one medicine or any one line of treatment. In one case we may have a plethoric patient with a full, bounding pulse; in another we may have an anæmic patient with a very weak and flabby pulse; and we may have various grades between these two extremes. One can very easily understand that the suitable treatment for the able-bodied, plethoric patient would be disastrous for the weak, anæmic patient.

In speaking of the different medicines I shall try in the first

place to recommend those medicines which are suited for all cases, and shall then speak of other medicines which are suitable under special circumstances. In considering the different lines of treatment pursued by different schools one learns that each method generally combines two or more remedies. The following combinations are among the most common: Morphine and chloral, chloroform and chloral, morphine and veratrum viride, morphine and bleeding, bleeding and transfusion of salt solution, etc. There are also such combinations as morphine, chloroform and chloral with subcutaneous injection of normal salt solution

The so-called morphine treatment of eclampsia will be first described. This treatment has been commonly used in parts of Germany, France, the United States and Canada, during the last fifteen to twenty-five years. It was looked on with much disfavor in Great Britain for many years, but its comparatively recent adoption by the Dublin school in the Rotunda Hospital has made it popular in many parts of the British Islands. The modified morphine treatment, which has been carried out for twenty years in the Toronto Burnside, has generally proved satisfactory. It will be seen that we do not depend on morphine alone. Our rules are as follows:

Morphine.—When a fit occurs give immediately ½ grain of morphine by hypodermic injection; if fits recur give ¼ of a grain every half hour for two doses—that is to say, give 1 grain of morphine in one hour. If the convulsions still continue after the hour, give ¼ grain every two to four hours, but do not give more than 2½ to 3 grains in twenty-four hours.

Chloroform.—Administer a little chloroform during the convulsion, always withholding it during the interval between the fits. Aim at giving as little chloroform as possible.

Chloral.—Administer chloral (in milk, never as a watery solution, because the latter is apt to produce rectal tenesmus) *per rectum after ceasing to use chloroform*, 30 to 60 grains every four to eight hours.

Saline Injections.—Use injection of normal salt solution high up in rectum, or subcutaneously under the breast or in the loose tissue of the abdominal wall, one teaspoonful each of common salt and acetate of soda to the pint. Jardine thinks that the latter mixture has greater diuretic effect. Inject ½ to 2 pints every four or six hours as long as thought necessary.

Saline Irrigation of the Intestine.—Egbert Grandin advises hot saline irrigation of the intestine, using for the purpose 8 or 10 gallons of the solution. His method is described on page 303.

Croton Oil or Elaterium.—If the patient is plethoric, or even fairly strong, administer one to two drops of croton oil, mixed with a little butter, and placed as far back upon the tongue as possible, or $\frac{1}{5}$ of a grain of elaterium.

Calomel.—If the patient can swallow give by the mouth five grains of calomel, particularly if this has not been administered before the onset of the fits.

Rectal Enemata.—Administer a cathartic enema soon after giving the croton oil or calomel. The saline enema, composed as follows, is probably the best: Add to a pint of soap-suds 1 dessertspoonful of turpentine, 2 ounces of glycerine, and 1 ounce of Epsom salts.

Epsom Salts.—Try to secure free and almost continuous catharsis by the administration of Epsom salts as soon as the patient can be made to swallow. The best way to administer this is to give a saturated solution in small doses, 2 to 4 drams.

Veratrum Viride.—In a certain proportion of cases, especially when there is a full, strong pulse, give tincture of veratrum viride by hypodermic injection, 10 minims at once and 5 minims every half hour thereafter, until the pulse comes down to 60 or thereabouts.

Venesection.—Instead of using veratrum viride one may remove from the arm from 12 to 18 ounces of blood, but should never combine the administration of veratrum viride and venesection in the same patient.

Diet.—Give the patient very little solid food (considering milk as a solid food), but plenty of water; milk well diluted with ordinary water, or with tea, or with aerated waters, will answer very well for two or three days. Beyond this carry out the rules as to diet for toxæmia of pregnancy. (See page 289.) When the patient is in labor accelerate delivery as far as possible.

Before going any further into details as to treatment I may perhaps make certain comparisons. As far as Great Britain is concerned the two favorite methods of treatment at present are probably what may be briefly termed the morphine, on the one hand, and the chloroform and chloral on the other. I think that chloroform given in anything like a large quantity is decidedly

bad, because it is very depressing, while at the same time its action is temporary. Chloral is also depressing, and therefore the administration of these two medicines at one time is especially dangerous in the weak and anæmic. On the other hand, morphine is free from these objections. Lyle, one of the representatives of the Dublin School, tells us that it has the following advantages: 1. It controls the convulsion by allaying the irritability of the cerebro-spinal system. 2. It prevents excess of waste products being thrown into the blood. 3. It does not weaken the patient. 4. It does not injure the child. 5. It has no effect on the kidneys. 6. When the patient is under its influence labor often commences and quickly terminates without causing more convulsions.

While Lyle was in the Rotunda he treated 18 cases by the administration of morphine, with one death. In this case the morphine appeared to have no effect, the convulsions continued frequent and severe and the temperature rose rapidly to 106.6° F.

Morphine and Chloral Combination.—The joint administration of these two remedies is generally effective and has not the depressing tendency of a chloroform and chloral combination. The morphine is given first because its effect is both more rapid and pronounced. The chloral is given second because we think it is the best remedy at our disposal to prevent the recurrence of the fits after they have been brought under subjection by the morphine.

Morphine and Veratrum Combination.—The combined administration of morphine and veratrum viride is probably worthy of more consideration than it has generally received. Although I have administered veratrum viride a few times in hospital and also in private practise, I have generally found negative results. It may be because I have not given it in sufficiently large doses, and, in addition, it may be that the preparations I have used were not always reliable.

Veratrum Viride.—It is somewhat remarkable that such conflicting opinions as to the efficacy of veratrum viride should be expressed by competent obstetricians in the United States. Reamy says that it arrests the convulsions, produces diaphoresis and diuresis—that is to say, it cuts short the attack, and then acts most efficiently in the removal of the cause. In comparison with bloodletting he says that veratrum viride is at least equally effective, while the after effects are better. He contends that it is not dangerous when the patient is kept in the recumbent posture. If alarming

depression should intervene, morphine or tincture of opium, hypodermically, will at once remove the unpleasant symptoms. This furnishes one of the reasons why the administration of these two medicines, morphine and veratrum viride, is especially suitable.

Clifton Edgar says with a pulse strong as well as rapid, veratrum viride affords the most certain means at our command for temporarily, or even permanently, controlling the spasms.

Hirst says veratrum viride is most valuable in cases with a strong, bounding pulse, with suffused face, and danger of cerebral apoplexy. In an asthenic patient with feeble pulse and pale face it should not be employed.

Davis says in cases with full heavy pulse and increased pulse tension it lessens arterial tension, slows the pulse, diminishes the tendency to convulsions, and promotes the dilatation of the cervix uteri.

Morris says when the pulse is feeble and rapid, the patient profoundly toxic and unresponsive to the usual treatment, he has never seen any benefit from veratrum; indeed, such cases require stimulation of the circulation, rather than depression.

Boyd says if used at all it is indicated only in the asthenic cases. He has used it to its physiological effect, reducing the pulse rate from 130 to 70 with no improvement in the patient's condition, but rather acting as a powerful depressant.

Marx denies the statement that under its influence the pulse becomes soft, slow and compressible, and then convulsions cease. He has seen awful convulsions when the pulse was 60 and alarmingly feeble. In a fatal case, that of the wife of a physician, a convulsion occurred one-half hour after an induced labor. The pulse was full and bounding and 178 to the minute. Hypodermics of full doses of veratrum viride sent the pulse down to 50, when it was hardly to be felt, and yet the worst convulsion the patient ever had occurred at this time, and she succumbed to the malady in a short time. And yet, in another woman, full doses of a reliable preparation were given to control the fits while the pulse was full and bounding and the face deeply cyanotic, and neither the pulse nor the very severe convulsions were controlled.

Saline Injections.—The use of saline injections (mentioned on page 299) has become very popular in recent years, especially in the treatment of eclampsia, puerperal septicæmia, and anæmia from severe hæmorrhages. The effects are, in toxæmia and ec-

lampsia, to dilute and delay the action of the poison, to stimulate the patient as in cases of sepsis, and to cause diuresis and more or less diaphoresis.

It is well, however, to remember that dangers may result from excessive use. As a writer in Obstetrics recently put it—carried along by our enthusiasm and imbued with a sense of the innocuousness of water and a pinch of salt, we may not realize, until confronted by an unhappy experience, that it is quite easy to drown a patient with artificial blood serum. Four pints in twenty-four hours should be the maximum amount injected.

Direct introduction of the salt solutions into the vessels is the most difficult and probably the most dangerous method, because of the possibility of the admission of air, and the danger of sepsis. Another danger that is not so generally recognized is overdistention of the heart. The strain upon the heart from the convulsions is already very great; this strain may be increased by overdistention of the heart through the direct venous injections. Subcutaneous injection is more easy of performance than intravenous and much less dangerous. There is, however, always one element of danger, from sepsis.

The third method, of introduction of liquids into the alimentary canal, is altogether the safest, and for ordinary purposes should be considered the best. We require no complicated apparatus and we practically have no danger to fear. If these saline enemata are administered with care high up into the colon, they are generally retained and quickly absorbed. For an ordinary physician, especially in country practise, direct venous injection is especially difficult and serious, while the subcutaneous injection is by no means easy. In all instances, however, the injection into the bowel is comparatively simple and easy. But one should be prepared at any time to give the subcutaneous injection when required.

Hot Saline Irrigation of the Intestines.—Copious irrigation of the bowel has been mentioned. Grandin describes his method as follows:

The woman is placed in the left lateral position, with buttocks elevated and head lowered; a large rectal tube is inserted into the bowel as far as may be, usually up to the sigmoid flexure; the rectal tube is connected with a gravity syringe which is hung at least six feet above the head of the patient. If such a syringe is not at hand the physician will find a funnel in every household and this

may be connected with the rectal tube by means of rubber tubing. The strength of the solution of hot salt water should be about 1 per cent. and the temperature of the water in the reservoir about 118°. An attendant should hold the rectal tube at the anal margin to prevent its being expelled as, under the peristalsis of the bowel, the water is driven out. From 8 to 10 gallons of water should be allowed to flow into the bowel, a large proportion of which of course returns. This accomplished, the woman should be wrapped in blankets and made comfortable in bed; in the mean time croton oil may be placed on the tongue and glonoin (nitroglycerine) may be administered in full doses hypodermically, if the character of the pulse demands it.

It may be stated here that, as a rule, in the condition under consideration glonoin is called for, but the dosage must be large—that is to say, fully $\frac{1}{2\frac{1}{5}}$ of a grain or 4 minims of the officinal Liq. trinitrini, repeated half-hourly until the physiological effect has been secured. This drug offers us the readiest of all means for relaxing the spasm of the renal capillaries.

Very soon after irrigation profuse diaphoresis sets in, followed by abatement in the alarming symptoms, and shortly thereafter the kidneys may begin to excrete again. The explanation of the effect of the hot saline bowel irrigation is not far to seek; the nerve centers are stimulated, the kidneys are directly stimulated, the skin is called into action, peristalsis of the intestinal tract is evoked; in short, every indication is promptly met.

I have given Dr. Grandin's description and his explanation of it almost in his own words. In one case I ordered the nurse to carry out this line of treatment, but she was unable to do so satisfactorily. I have had it in view in three or four other cases, but the ordinary saline enemata had such good effect that I did not try this copious irrigation. I think, however, that it ought to prove very efficacious in certain instances. I have not used glonoin during eclampsia, but I have sometimes found it very useful in certain cases of chronic nephritis (see page 278).

Croton Oil.—It is very important in connection with the treatment of eclampsia to avoid a mere routine plan of medication. Medicine which may be quite useful in one case may kill the patient in another. Croton oil is one of these. Croton oil should never be administered to a patient who is weak and exhausted.

Some years ago I saw a patient after she had passed through

several convulsions. Two drops of croton oil had been administered shortly before my arrival. She had a flickering, weak pulse. Life was trembling in the balance. The croton oil, however, was (I thought) doing its work. She soon ceased to breathe.

In two other instances in recent years I have advised against croton oil, with a firm conviction that its administration would kill the patient. In my own practise I give croton oil to only a small proportion of patients suffering from eclampsia.

Pilocarpine.—Notwithstanding many warnings, the medical world does not fully appreciate the grave dangers involved in the administration of pilocarpine. The following report will illustrate:

A patient in the Burnside was seized with eclampsia. Had four convulsions during labor, three after. Treatment: chiefly morphine, catharties, saline injections *per rectum* and subcutaneously. Two excellent house surgeons were in charge during the night. Patient very low at 2 A. M. One dose of pilocarpine given hypodermically to act on the skin as a last resort. Soon there was a very copious secretion in the bronchial tubes which threatened to choke the patient, and it was thought for two hours that she could not recover. Her relatives were sent for. By putting the patient on her side and keeping her head low and turning it in such a way as to allow liquid to flow from the mouth, and with the administration of strychnine, she finally rallied. Miss McKellar, the matron, was unfortunately in bed when the pilocarpine was administered, and the doctors did not know that I had given standing orders that no dose of pilocarpine was to be administered to any patient unless ordered by a member of the visiting staff.

About twenty years ago a patient was attended by two physicians of Toronto, one of whom was the late Dr. MacFarlane. A dose of pilocarpine was administered and was soon followed by this copious bronchial secretion, which killed the patient in a few minutes, notwithstanding all the efforts of the physicians to prevent such a catastrophe.

Many similar results have been reported by physicians in different parts of the United States and Canada. The late Fordyce Barker gave due warning as to these dangers something like twenty-five years ago, but it took the medical world a long time to learn the lesson which he tried to convey. The rank and file of the physicians in Great Britain appear not to have learned it yet. I see many reports from physicians, published in the Lancet and

British Medical Journal, of cases where pilocarpine appears to be administered as a matter of course.

Not long since Pollock Simpson gave a report of three cases of eclampsia in the Lancet. In his notes as to treatment he speaks of morphine as being of great value where paraglobulin predominates in the urine. Chloral, bromide, and chloroform, he says, are all valuable, but where all the above remedies fail $\frac{1}{5}$ of a grain of pilocarpine given hypodermically will produce profuse diaphoresis in twenty minutes.

The most unfortunate feature in connection with such treatment is that the pilocarpine is apt to be administered as a last resort after other remedies fail—that is, just at that particular time when the pilocarpine is most apt to produce its deadly effects on the patient.

ACUTE OR CHRONIC NEPHRITIS WITH ECLAMPSIA

Certain views have been expressed as to the proper treatment of ordinary nephritis in pregnancy. A few words may now be added respecting acute and chronic nephritis and their connection with that form of auto-intoxication of pregnancy which I have called eclampsic toxæmia. I have endeavored, to some extent, to disassociate the chronic nephritis from the toxæmia, but it should be remembered that they may occur together. A certain proportion of women with nephritis show evidences of toxæmia during pregnancy.

The Induction of Abortion or Premature Labor.—The induction of abortion or premature labor is not advisable nor justifiable, excepting as a last resort, when, after all other methods have failed, the patient's life appears to be endangered. The following quotations from certain authors will show to some extent the differences of opinion which exist:

Charpentier says we must wait until the labor begins spontaneously and let it go undisturbed when it is possible. We must induce the labor only in exceptional cases. Cæsarean section and "accouchement forcé" are to be absolutely rejected as usual methods for the treatment of eclampsia. We must have recourse to these operations only in cases of failure of every medicine and when the mother seems on the point of dying. In short, we must keep it as a last resource in desperate cases.

Mangigalli tells us that the prompt evacuation of the uterus constitutes the most important point of the treatment of eclampsia. In eclampsia during labor it is a good rule to finish the accouchement when the permitting conditions exist, and to anticipate these by means of several incisions of the cervix when the dilatation is not sufficient. When the eclampsia occurs before labor, he advises the induction of labor by means of the rupture of the membranes and the administration of morphine or chloral or veratrum viride, and thinks that sometimes forced dilatation is better than the incisions of the cervix.

Dührssen says when eclampsia has already set in the only rational treatment is the immediate emptying of the uterus under deep anæsthesia. With this, as he has proved in 93 per cent. of the cases, the eclampsia ceases at once or very soon. The dangers of the operative interference are slight compared with the dangers of eclampsia. If the operation is carried out antiseptically, and the author's method is adopted of plugging the utero-vaginal canal with iodoform gauze to control the frequent atonic secondary hæmorrhages, the mortality from eclampsia has already been proved to be less after delivery under deep anæsthesia than after spontaneous delivery. The mortality after operative emptying of the uterus will, he believes, still go down markedly if delivery is effected whenever possible at once after the first fit noticed. The immediate emptying of the uterus is, in his opinion, indicated in any stage of pregnancy, because eclampsia always kills the fœtus in the first seven months, either directly or by inducing premature labor. Dührssen's rather radical methods are not generally approved. I shall illustrate this point by citing a few cases:

Case I. Mrs. B., aged twenty-one. I para. Seven and one-half months advanced in pregnancy. Suddenly seized with convulsions. Dr. Charles J. Hastings was summoned. Administered morphine hypodermically and a copious cathartic enema, also a little chloroform during convulsions. Met Dr. Hastings in consultation after six convulsions. No signs of labor, os uteri small, and cervical canal apparently intact. Induction of premature labor considered but postponed for the time being. Altogether thirteen convulsions between 2 P. M. and midnight; none after. Free catharsis kept up with saturated solution of Epsom salts after patient became conscious. Patient remained in bed. Five days after labor came on spontaneously and progressed favorably. No further convulsions. Babe still-born. Patient made a good recovery.

This was a case where men holding opposite opinions, such as those I have referred to, would have disagreed. Dührssen and his school would have said: "Empty the uterus at once." Charpentier, and those who agree with him, would have said: "Do not interfere; leave the case to Nature if possible."

My own practise is to abstain from interference if possible, particularly with such conditions as here existed. The induction of premature labor, with a cervical canal apparently intact, would entail an amount of violence which I think unadvisable if it can be avoided. I prefer, in the first place, to try the effects of morphine and free catharsis, with perhaps chloroform and chloral administered as before described. In at least a large proportion of cases thus treated, the induction of premature labor is not required.

Case II. Very shortly after seeing this patient with Dr. Hastings I saw a patient in the Burnside a few minutes after her first convulsion. While examining her a second convulsion occurred. Chloroform administered. No dilatation of the os, but cervical canal had apparently disappeared. The os appeared to be to a certain extent at least dilatable, so I decided to make an attempt to dilate. The patient thoroughly anæsthetized, parts easily dilated, podalic version, living child easily extracted in a few minutes. Two convulsions after. Patient made a good recovery.

In this case it happened that the emptying of the uterus in the way described was a very simple and easy matter. Under such circumstances I think it always better to empty the uterus. In the majority of cases, however, when convulsions come on during pregnancy the induction of premature delivery is not so simple a matter.

Case III. I. S., aged eighteen. I para. Burnside. At or near full term. Headache and albuminuria. Free catharsis soon established. Notwithstanding this convulsions occurred shortly after. Treatment, morphine ½ grain hypodermically. Pulse showed high tension, so one hour after gave morphine ¼ grain and tincture of veratrum viride 20 minims. Pulse tension still high; convulsions continuing. Two hours after last injection another ¼ grain of morphine with 15 minims of tincture veratrum viride. Four hours after, morphine ¼ grain and veratrum viride 10 minims. Pulse tension diminished slightly but rate still rapid. It appeared to me that the veratrum viride had little or no effect. Chloral then administered *per enema*. Labor assisted, child extracted stillborn. Patient recovered.

In this case I had an idea that 45 minims of tincture of veratrum viride had little or no effect. As to the quality of the medicine I am now doubtful.

Case IV. The following case, reported by McIlwraith, shows different results. G. M., aged nineteen. I para. Delivered November 17th. Albuminuria. Brisk catharsis induced. The following day, convulsions. Morphine hypodermically and saline solution subcutaneously administered. Convulsions continued during the whole day, and morphine did not appear to control them. Catharsis kept up with calomel and compound powder of jalap. Fifteen minims of fluid extract of veratrum viride hypodermically. One hour after this the pulse had fallen from 120–160 to 60 and was changed in character, becoming quite soft. At the same time profuse sweating occurred. Rapid recovery then took place.

I have not seen such good results in any of the six or eight cases in which I have administered the veratrum viride. However, after so much testimony in its favor a few such results as those coming under my own eyes or within my own intimate knowledge might make me think much more favorably of a drug now so popular in some parts of this continent.

Case V. J. B., aged twenty-six. II para. Burnside. Two convulsions before admission. Condition on admission, comatose, breathing stertorous, pupils slightly contracted, puffiness under eyes, œdema in feet and legs, a small amount of urine, about 1 ounce, by catheter, loaded with albumin, convulsions every hour for fifteen hours. Fœtus expelled during thirteenth convulsion, dead, full term. Two convulsions in two consecutive hours after delivery. Still comatose. Urine 7 ounces in twenty-four hours. Treatment, croton oil, morphine, chloral, bromides, catharsis. After administration of saline enemata, 1 pint every four hours, quantity of urine increased to 40 ounces in twenty-four hours. On second day after commencement of convulsions patient very weak, pulse 140, respiration 30, Cheyne-Stokes type. Brandy and strychnine hypodermically and nutrient enemata instead of the saline. Gradual improvement third day; rapid improvement after patient became conscious. Had been comatose seventy-two hours. Good recovery.

This case is remarkable in showing the happy possibilities that may exist even when a patient is in an apparently hopeless condition. Sometimes it is an exceedingly difficult matter to decide as to prognosis. One patient may recover from a desperate condition while another seems to die somewhat suddenly. A cerebral hæmorrhage may account for the death in certain cases where the symptoms have been comparatively mild, but post-mortems show that this is not always the cause under such circumstances.

CHAPTER XIV

EXTRA-UTERINE OR ECTOPIC PREGNANCY

In Parry's remarkable book on extra-uterine gestation, published in 1875, we find the following appeal to surgeons:

"A bleeding vessel, through which the red stream of life is rushing away, can be ligated. A gangrenous limb, which is destroying its possessor by sending its poisonous emanations to the remotest regions of his body, can be amputated. A cancerous breast, which is sapping the vitality of its victim hour by hour, can be removed with the prospect of temporary relief. An aneurysm, that places life in constant jeopardy, can often be cured by proximal or distal ligation. The tumultuous motion of a heart organically diseased may be quieted till Nature restores the balance, after which the person may enjoy a long and even a useful life. Even phthisis now counts its many cures; but here is an accident which may happen to any wife in the most useful period of her existence, which good authorities have said is never cured and for which even in this age, when science and art boast of such high attainments, no remedy either medical or surgical has been tried with a single success. From the middle of the eleventh century, when Albucasis described the first known case of extra-uterine pregnancy, men have doubtless watched the life ebb rapidly from the pale victim of this accident, as the torrent of blood is poured into the abdominal cavity, but have never raised a hand to help her. Surely this is an anomaly and it has no parallel in the whole history of human injuries. The fact seems incredible, for if one life is saved by active interference it may be triumphantly pointed to as the first and only instance of the kind on record. In the whole domain of surgery—for we can not look to other than surgical measures under the circumstances—there is now left no field like this. The only remedy that can be proposed to rescue a woman under these unfortunate circumstances is gastrotomy, to open the abdomen, tie the bleeding vessels, or to remove the sac entire."

Although here Parry actually tells the surgeon exactly what he should do in a case of rupture of an ectopic gestation sac, yet for years no one acted on his advice. In eight years, however, Parry's challenge was accepted by Lawson Tait, at that time undoubtedly the greatest living abdominal surgeon, who deliberately operated for tubal rupture in 1883.

The following is a brief report of an interesting case:

On a cold winter night, about six years ago, a woman lay ill in a poor tenement house, east of the Don river, in Toronto. During the day she was working as usual and looking after her young infant, fifteen months old. In the evening she had a sudden attack of extreme pain with all the signs of collapse. Toward midnight she was seen by Dr. Rowan who sent for Dr. James F. W. Ross. When the latter arrived he found the patient blanched and collapsed, cold extremities, pulseless, or almost so, at the wrist. There could be no doubt as to her condition. She was fast bleeding to death after a rupture of an ectopic gestation sac. Was it possible to save her life? Ross decided to give her a chance, the only one left, by abdominal section and ligation of the bleeding vessels. He gave his directions; one to telephone the hospital to have everything in readiness, another to summon me. Ross gave the baby to a neighbor to look after, took the patient in his arms, carried her to his carriage, and brought her to the hospital. During this momentous journey he feared that every moment might be her last. When I reached the hospital the patient was on the table—not dead—that is about all one could say. Would I sanction an abdominal section? Yes. In ten minutes the operation was completed, the woman made a good recovery and is alive to-day.

One may learn from this report that it is not necessary to travel far to find examples of deeds of daring, deeds of skill, deeds of love. The treatment of accidents incidental to ectopic gestation forms probably the grandest triumph of modern obstetrical surgery.

Definitions.—Extra-uterine pregnancy means pregnancy where the impregnated ovum remains and is developed outside the uterus. This definition is not always correct, because the ovum may be developed in that portion of the tube which is passing through the wall of the uterus—known as the interstitial or tubo-uterine pregnancy. Ectopic pregnancy—i. e., misplaced pregnancy—is the correct term.

Varieties.—*Primary.* Referring to complete (?) or partial development of ovum where it is fertilized and retained.

Varieties of primary ectopic pregnancy. (*a*) Tubal—including tubo-uterine or interstitial. (*b*) Ovarian—exceedingly rare.

For practical purposes we may consider that all ectopic pregnancies are primarily tubal.

Secondary.—When rupture of the tube occurs and the fœtus is developed in a new position.

Varieties of secondary ectopic pregnancy: (*a*) Abdominal or intraperitoneal. When the fœtus surrounded by its unruptured amnion is developed in the abdominal cavity. (*b*) Broad ligament, intraligamentous—or extraperitoneal. When the lower border of the tube ruptures and the fœtus is developed between the folds of the broad ligament outside the peritoneal cavity.

Frequency.—The frequency of ectopic gestation is thought by some to be 1 in 500 pregnancies. It is probably much more frequent.

Course of Ectopic Gestation.—Clinically, the course of ectopic gestation is as follows: The woman is pregnant, but the fertilized ovum, or gestation sac, is in the tube. This causes no characteristic symptoms for a time. The sac soon becomes too large for the tube, and in the first or second month, or perhaps the third, the tube is ruptured. When the rupture is on the front, back, or upper side of the tube the embryo passes into the peritoneal cavity, together with more or less blood from the torn vessels. When the rupture is on the under side of the tube the embryo passes between the two layers of the broad ligament and with it a certain amount of blood. In this intraligamentous variety the embryo and collections of blood are extraperitoneal. If the patient survives, the embryo may be fully developed beneath the peritonæum, its layers (especially the posterior) being more or less stripped from the abdominal parietes; or, the ligamentous covering may rupture at any time between the twefth week and full term, allowing the contents to pass into the general peritoneal cavity. Frequently the embryo dies early, before the sac has become large enough to rupture the tube, and a mole results.

Etiology.—The supposed causes of ectopic pregnancy are:

1. Salpingitis—inflammation of the mucous membrane of the Fallopian tubes, causing destruction of the ciliated epithelium lining the tube.

2. Accidental obstruction of the tubes from pressure of tumors or parametric inflammatory products.

3. Atrophic condition of the tube, either congenital or due to hyperinvolution after a former labor.

Many obstetricians think that it is generally due to preexisting gonorrhœal salpingitis. Without discussing this subject now in detail it may be stated that a physician should refrain from deciding off-hand that old gonorrhœa is the cause of this condition. The physician may be wrong in giving such a cause, and may at the same time do a great injustice to his patient, her husband, or both.

Many authorities, including Lawson Tait and Berry Hart, believe that tubal disease must precede tubal pregnancy, while others, including Bland Sutton, Martin, John Taylor, and Clarence Webster believe that pregnancy may occur in a healthy tube.

PRIMARY ECTOPIC GESTATION

Early History of Tubal Pregnancy.—The early life history of tubal pregnancy, so far as it is known, is admirably described by John W. Taylor. According to him we have to consider especially three things: 1. The attachment of the ovum. 2. The increased vascularity of the parts affected. 3. The swelling produced by the growing pregnancy.

The ovum becomes embedded in the mucous membrane of the tube about as it normally does in the uterine decidua. Whether there be any true decidual tissue formed in the tube or not, it is generally admitted that a special zone of mucous membrane differentiates into a potential decidua serotina, and that the chorionic villi become developed in this zone. As this development goes on the ovum soon becomes somewhat strongly attached at the placental site, the blood-vessels in the part all become much enlarged, the branches of the ovarian artery and the uterine artery are found to be greatly dilated. This hyperæmia is very important because through it nourishment is afforded to the growing ovum. There is with it, however, an element of danger in case of rupture when the great hyperæmia is apt to cause excessive hæmorrhage.

The ovum grows somewhat rapidly, distends the tube in such a way that a globular swelling may be felt on one side of the uterus. At the same time certain changes are going on in the uterus; it becomes slightly increased in size and the uterine decidua is formed within it (Fig. 119). After the death of the ovum this decidua passes away from the uterus; it may be in shreds, but it is some-

times passed entire as a perfect cast of the interior of the uterus (Fig. 122). It is important to note, however, that in the so-called membranous dysmenorrhœa a similar cast is sometimes passed.

Early Rupture of the Tube.—Rupture of the tube is one of the most serious and one of the most common accidents connected with ectopic gestation. In the case reported it was supposed by Ross that the duration of pregnancy had been not more than two weeks. An interesting question arises in this connection. Is a patient likely to have as copious a hæmorrhage from rupture after two weeks as after ten weeks? Frequently very early ruptures are accompanied by more copious hæmorrhages than the later ruptures. Taylor calls special attention to this and tells us that early rupture of the tube from a pregnancy of two to six weeks duration is a special phenomenon which has not received the recognition and consideration it deserves. He tells us that, as a disease or accident, it stands alone, there being no warning of danger, frequently no physical signs of any sort, until symptoms of collapse suddenly appear from copious bleeding. In Ross's case the operation was done in about ten hours after symptoms appeared. In these cases of early rupture, without operative interference, death usually occurs in from twelve to forty-eight hours.

Fig. 118.—Ectopic Gestation, showing Rupture of the Tube and the Corpus Luteum. (Tor. Univ. Museum.)

Cullingworth reports a case where a patient died within three hours from the beginning of the attack.

Generally, after rupture into the peritoneal cavity, the hæmorrhage is "diffuse"—that is, the blood passes into those parts of the peritoneal cavity where there is the least resistance. Occasionally, however, we find a more favorable issue—that is, the formation of a definite hæmatocele.

Tubal Mole.—In certain cases the embryo dies without causing rupture of the tube. Such death is probably caused by the pouring out of blood into the space between the amnion and chorion. Under such circumstances the dead egg, or blighted ovum, becomes a mole. The history of this mole is interesting. One might suppose that such early death of the embryo should make things comparatively safe. This is not the case, however, as the presence of this mole within the tube generally causes serious trouble.

Tubal Abortion.—The mole is sometimes extruded into the peritoneal cavity, such extrusion causing tubal abortion. It is probable that tubal abortion (extrusion of ovum from the tube) takes place in only a small proportion of cases.

Generally, the mole remains strongly attached to that portion of the inner surface of the tube where the placenta would have been

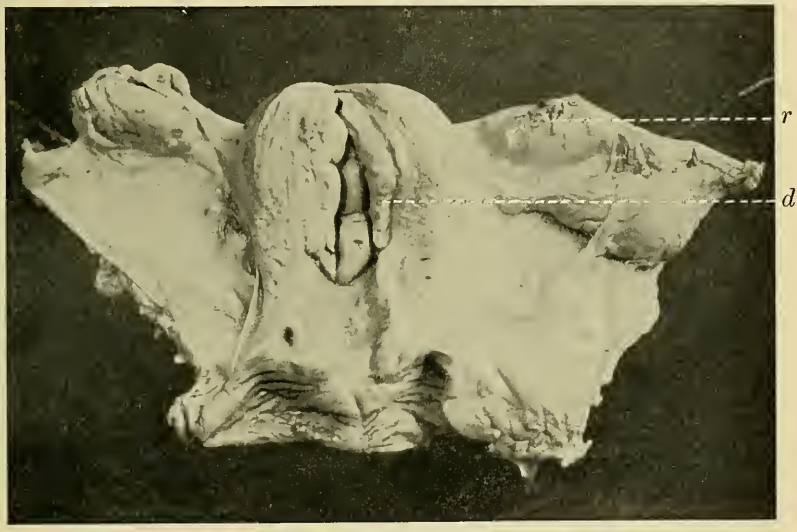


FIG. 119.—ECTOPIC GESTATION, RUPTURE.

Immigrant found dying from hæmorrhage at Union Station, Toronto. Part of anterior wall of uterus removed; *d*, thickened decidua; *r*, site of rupture. (John Caven, Tor. Univ. Museum.)

developed if pregnancy had not been interrupted. As Taylor expresses it, the mole clings to the tube like a pedunculated polypus, the mole being free excepting at the one point of attachment.

This mole is a continuous source of irritation and causes great

hyperæmia in the surrounding tissues. As a consequence of this hyperæmia we are apt to have numerous, and sometimes dangerous, hæmorrhages from the tube into the peritoneal cavity, forming the most common variety of intraperitoneal hæmatocele.

Some authors give the following definition:

Tubal abortion is complete or partial separation of the ovum from the tube wall. According to this definition there are two kinds of tubal abortion: (1) Incomplete abortion—partial detachment of the ovum. (2) Complete abortion—complete detachment and extrusion of the ovum from the tube.

Later Rupture of the Tube.—Later rupture may occur at any time from the first month onward, but is most common from the second to the fourth month (Taylor). Later rupture is more common when the egg is situated in the middle or outer portion of the tube; in this position it is more apt to open up to some extent the two layers of the meso-salpinx, thus causing delay of the rupture. Rupture, under such circumstances, when it does take place is sufficiently serious, but not so rapidly "fatal without warning" as it is in the case of early rupture. The hæmorrhage is sometimes very slight if not altogether absent. When the placenta is separated or torn during the rupture the bleeding is severe, but when it is not involved the hæmorrhage will come from the ruptured tube alone and may be very slight. Even when the placenta is involved the hæmorrhage seldom causes death within a short time.

HÆMORRHAGES DUE TO ECTOPIC GESTATION

These various forms of hæmorrhage may now be considered in detail:

Diffuse or Unlimited Hæmorrhages.—As before stated, the hæmorrhage after rupture of the tube is frequently so copious that there is not time for the blood to become surrounded by any adventitious capsule.

Intraperitoneal Hæmatocele.—This form of blood tumor is very interesting and much better understood now than it was twenty years ago. It is occasionally due to other causes, but, practically, we may consider that intraperitoneal hæmatocele is due in some way or other to tubal gestation. We may accept Taylor's statement that rupture of the tube is especially liable to be followed by the diffuse bleeding; while hæmorrhage from an

unruptured tube containing a mole is the most common cause of the intraperitoneal hæmatocele.

The hæmatocele of the tubal mole forms slowly through the more or less continuous blood drip from the fimbriated end of the tube, giving time for consolidation of the outer layer of blood, producing a sort of capsulation.

The unstable peritoneal hæmatocele is a very indefinite thing. A considerable collection of blood within the peritoneal cavity may become rapidly and completely absorbed. When not ab-

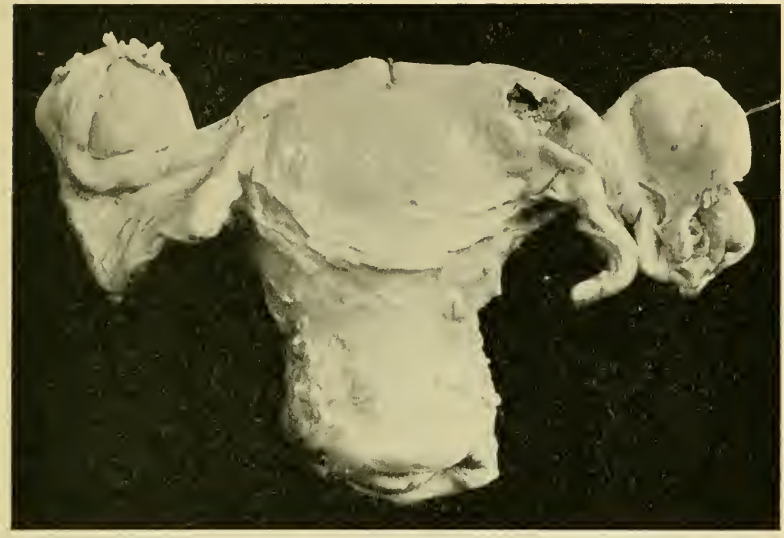


FIG. 120.—INTERSTITIAL ECTOPIC PREGNANCY, RUPTURE.

Healthy woman died after an illness of a few hours. Post-mortem examination made by order of coroner to ascertain cause of death. (N. A. Powell, Tor. Univ. Museum.)

sorbed the blood may fill the pouch of Douglas and rise above the uterus. It may become covered by a fibrinous capsule, part of which is formed by surrounding viscera matted together by adhesions. The collection of blood being thus shut off from the general cavity of the peritonæum becomes the hæmatocele. As Taylor tells us, a fresh hæmorrhage may break through the weak capsule and thus become profuse. Other things may happen, however. The hæmatocele may be absorbed, or it may become septic and transformed into an abscess.

Extraperitoneal Hæmatocele or Broad Ligament Hæmatoma.—After rupture of the lower border of the tube more or less hæmorrhage takes place, and the blood thus poured out forms an extraperitoneal hæmatocele. Hæmatoma of the broad ligament may occasionally follow certain pelvic operations, especially those which involve ligature of the broad ligament. It may also occasionally be found in connection with abortion, labor, and irregular menstruation.

In a large proportion of cases the fœtus soon perishes after it passes below the tube and the blood poured out is slowly absorbed. The embryo is frequently absorbed at the same time.

I have had two cases of broad ligament hæmatocele (in one of which the patient was seen by Ross, in the other by Temple) in which absorption took place somewhat rapidly and completely, so that both patients made a perfect recovery within a few weeks.

Diagnosis of Diffuse Intraperitoneal Hæmorrhage and Stable Hæmatoceles.—Although the outpour of blood with or without the formation of a stable hæmatocele is simply an incident in the history of an ectopic pregnancy, the blood-mass often becomes the all-important matter both for diagnosis and treatment.

Pain. One of the most common symptoms associated with hæmatocele is pain, which frequently comes on suddenly and is often accompanied with vomiting. Sometimes the tenderness of the abdomen is extreme. The pain, however, soon abates in the majority of cases, and such abatement may cause the patient to think that she is not seriously ill, and may cause the physician to overlook the extreme gravity of the woman's condition.

Uterine hæmorrhage is also nearly always associated with the hæmatocele. The blood is generally dark in color, moderate in amount, and steady in flow.

Decidua in vaginal discharges is sometimes found. It is thicker than that expelled in membranous dysmenorrhœa.

Rise of temperature is a much more common symptom (according to Cullingworth) than is generally supposed.

The pulse is increased in frequency.

Menstruation. One period has been missed, as a rule, and menstruation has subsequently been irregular.

Physical Signs of Diffuse Intraperitoneal Hæmorrhage.—When there has been diffuse hæmorrhage the signs are very obscure. We have not, as a rule, the usual signs of the presence of a

free fluid in the peritoneal cavity. The thick tarry or coated blood which is present does not give the signs ordinarily found in ascites. It is quite true, however, that change of position does sometimes cause a change in the area of dulness found in the flanks, and fluctuation may occasionally be detected. The symptoms of internal hæmorrhage are generally sufficiently plain without the physical signs.

Vaginal Examination. The blood which is poured out is likely to soon fill the pouch of Douglas. This causes a "full and boggy condition" which can be detected by the examining fingers.

Physical Signs of Stable Pelvic Hæmatocele.—An irregular lump is generally easily detected by bimanual examination. Before

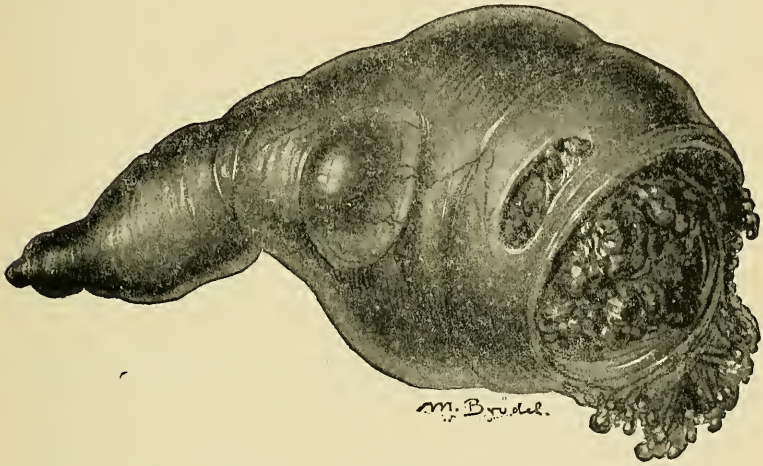


FIG. 121.—TUBAL ABORTION, OVUM BEING EXTRUDED THROUGH FIMBRIATED EXTREMITY (Kelly). ×1.

making an examination one should be sure that the bladder and rectum are emptied. The bimanual examination should be both vagino-abdominal and recto-abdominal. The recto-abdominal is generally the more useful in detecting and defining the smaller hæmatoceles. The "boggy" condition may be evident or the mass may be quite hard, especially after a time. This swelling is more or less tender and immovable. It is situated behind the uterus, pushing this organ forward and generally to one side. It distends the pouch of Douglas, depresses the vaginal vault, bulges into the rectum, and when larger extends upward into the abdo-

men. The upper border may be as high as the umbilicus and is generally irregular in shape and higher on one side than on the other. In the early stages—i. e., soon after the outpouring of blood—it is difficult to outline the swelling, on account of the general abdominal distention, the great tenderness, and the rigidity of the abdominal walls. As these symptoms subside and as the outer portion of the mass becomes hardened, the irregular outline of the lump can easily be detected.

Although in a majority of cases the free blood soon finds its way into the pouch of Douglas it does not always flow to this most dependent portion of the abdominal cavity by gravitation. The hæmatocele is not infrequently found surrounding the aperture through which the blood is escaping, especially in case of "blood drip" from the fimbriated extremity of the tube caused by irritation of the tubal mole.

Extraperitoneal Hæmatocele or Broad Ligament Hæmatoma.—The blood is confined within a fairly definite space between the peritonæum above and the pelvic fascia below. It strips up the peritonæum to some extent, but such separation is so limited and slow as to prevent anything like diffuse hæmorrhage.

The blood is poured first on one side and the lump may be easily felt. Sometimes the blood is forced over to the other side. If one has the opportunity to examine daily before and during the outpouring of blood he can detect perhaps a small lump close to the uterus (the unruptured ectopic pregnancy). After extraperitoneal rupture a large mass is easily felt as it fills (or nearly so) one side of the pelvis and pushes the uterus over to the other side. On the following day one may find that the posterior layer of the broad ligament is stripped from the uterine wall, allowing some blood to go to the other side of pelvis. The shape of the tumor is like a "jelly-fish," rounded above, concave below (Lawson Tait).

When, in exceptional cases, the effusion rises above the pelvic brim a rounded, well-defined tumor may be felt. Below the mass slopes off outward, appearing to merge into the pelvic wall. Per rectum it seems as if a half ring were pressing on the rectum, flattening it backward.

Differential Diagnosis.—In making a diagnosis, especially of the intraperitoneal variety of hæmatocele, one should keep in mind the following conditions: threatened abortion, retroversion of

a gravid uterus, salpingitis or salpingo-oophoritis, ovarian cyst with sudden twisting of the pedicle, and fibro-myoma.

SECONDARY ECTOPIC GESTATION

Tubo-Abdominal or Abdominal or Ventral Pregnancy.—The secondary forms of ectopic pregnancy are always derived from the primary form. When the fœtus, after rupture of the tube, passes into the abdominal cavity and becomes developed there we have one of the secondary forms of ectopic pregnancy, which is known as abdominal or ventral pregnancy. Some have thought that a young fœtus passing from the tube into the abdominal cavity must of necessity be destroyed by the peritoneal secretions, and that, therefore, all ventral pregnancies must have been originally sub-peritoneal or intraligamentous. It was supposed by Tait, Sutton, and others that the fœtus after remaining outside the peritonæum until the seventh or eighth month of pregnancy had become developed to such an extent that it could successfully resist the efforts of digestion by the fluids of the peritoneal cavity. It was also supposed that about this time there was rupture of the broad ligament cyst, allowing the fœtus to pass into the general peritoneal cavity.

I think Taylor is correct in saying that after the later rupture of the tube (that is, in the third or fourth month) the fœtus may pass directly into the peritoneal cavity and be developed there, being protected from the action of the fluids by the unruptured membranes, especially the amnion. The enveloping amnion being nearly transparent is not easily seen, and has consequently been often overlooked, but careful examination will probably show that it is present in every case of abdominal pregnancy.

Tubo-Ligamentous Pregnancy or Broad Ligament Pregnancy.—This comes about in the following way: As the fructified ovum grows the tube expands and in doing so separates to some extent the mesosalpinx as before mentioned. The lower edge of the tube is thus pressed toward the loose connective tissue which there exists, and at a certain time is ruptured. This allows the fœtus to escape into this connective tissue, while the placenta retains, in part at least, its connection with the tube as in the abdominal pregnancy. In the one case the fœtus passes downward and is developed beneath the peritonæum, while in the other it passes

upward and is developed within the peritonæum; in both cases the placenta is to a large extent stationary.

DIAGNOSIS OF ECTOPIC GESTATION

Every physician who is engaged in obstetrical practise should endeavor to become an expert diagnostician as to all varieties and all phases of ectopic pregnancy. The obstetrician meets with such cases as a rule before the gynæcologist or surgeon. The obstetrician should also be prepared to operate in certain cases of emergency. When, for instance, an operation is urgently required minutes frequently count. A practitioner in the country can not wait for hours or days until he procures an expert from a neighboring city without in certain cases sacrificing the patient's life. Remember Cullingworth's patient, the wife of a physician by the way, who died in three hours after the appearance of the first symptoms.

It is usual in speaking of symptoms first to consider those which occur before rupture of the tube. Sometimes, however, the first symptoms noticed are those due to rupture of the tube with rapidly following results that are truly appalling in character. In speaking in detail as to diagnosis I shall, therefore, take up first the earliest rupture.

Varieties.—The varieties may again be mentioned in what may be called their chronological order as to the appearance of the symptoms.

1. Earliest rupture of the tube with diffuse hæmorrhage into the abdominal cavity.

2. Unruptured tubal pregnancy with a living ovum or with a dead ovum or tubal mole, with perhaps intraperitoneal hæmatocele probably encapsulated.

3. Later rupture of the tube and escape of fœtus with either diffuse hæmorrhage into the peritoneal cavity or only slight hæmorrhage with perhaps the formation of hæmatocele generally unstable in character; or, on the other hand, a later rupture of the tube with escape of the fœtus and hæmorrhage beneath and outside the peritonæum.

4. Growing pregnancy, full term pregnancy, or dead pregnancy.

Symptoms of Earliest Rupture.—I shall consider these symptoms chiefly from a clinical standpoint, drawing largely from the graphic descriptions of Cullingworth and Taylor.

The signs and symptoms are those of acute and sudden abdominal lesion plus those of severe internal or concealed hæmorrhage. The patient, during the child-bearing age, has been previously in good health and is suddenly seized with a severe pain in the abdomen "as if something has given way inside her." This pain is often accompanied with vomiting. She soon becomes faint and more or less collapsed. She probably lies down on a couch or is assisted to her bed. Along with this pain there is generally extreme tenderness of the abdomen. She remains quite conscious. Along with the usual signs of collapse there is a gradually increasing pallor of the surface, the patient at the same time having a seriously "passive" expression.

Are these symptoms due to simple faintness or active hæmorrhage? The pulse will tell. If due to faintness the pulse when found will be slow and moderately full. If due to serious hæmorrhage the pulse increases in frequency (20 to 40 more than normal) and becomes weaker. This rapidity of the pulse is not due to nervousness or excitement for the patient is curiously self-contained and quiet. The temperature soon becomes subnormal. If the hæmorrhage continues a colder grayness slowly creeps over the countenance, the voice becomes feeble, sight dimmed, the fingers white and cold. The patient becomes restless, often sighs deeply, yawns, and exhibits other signs of weariness, and if left untreated gradually sinks, maintaining a perfectly clear intellect to the last.

In making a diagnosis Cullingworth attaches much importance to the following points:

1. The previous good health of the patient making it highly improbable that the symptoms are due to gastric or intestinal perforation, or to rupture of an internal abscess or suppurating cyst.

2. The gradually increasing pallor of the patient and the gradually rising pulse rate without corresponding rise of temperature.

3. The extreme tenderness of the abdomen.

4. If a menstrual period has been missed or is overdue the diagnosis is facilitated, but regularity of menstruation does not exclude ectopic pregnancy. She has perhaps missed a period which was due a few days before the seizure. There was perhaps some discharge of blood from the vagina quite profuse for a time, shortly before the seizure. Although there may have been such a discharge of blood the period did not come on properly.

Symptoms of Unruptured Tubal Pregnancy.—In unruptured tubal pregnancy the patient has generally missed a menstrual period. This is followed by irregular uterine hæmorrhages not similar to regular menstruation. The blood discharged is generally dark in color and different from the discharge in uterine abortion, which is often very copious and accompanied by gushes of bright red blood. Considerable importance is attached by some to the passage of decidual membrane, but Ross thinks it is not of much value in diagnosis because it is generally extruded at a somewhat later stage and only after serious symptoms have set in. Paroxysmal "bearing down" pains are frequently present. Breasts are frequently enlarged and tender as in ordinary pregnancy.

FIG. 122.—ECTOPIC GESTATION, UTERINE DECIDUA EXPELLED ENTIRE. (Temple. Tor. Univ. Museum.)

Physical Signs.—Pulsating vessels are sometimes felt in vaginal vault on one side of the uterus. A tubal tumor is found on same side generally close to back of uterus, hard, round and not pitted like the ovary. At the same time the ovary may be made out as distinct from the tubal tumor (Ross). The round ligament lies on the median side of the tumor—i. e., between the body of the uterus and the tumor. The tumor has a pedicle formed by a part of the tube and the mesosalpinx holding the same relations to the uterus, broad ligament and ovary as the hydrosalpinx does—that is to say, the body of the uterus is well defined and separate from the tumor on its inner (median) side. The ovary is also found intact (Kelly).

Tubo-Uterine or Interstitial Pregnancy.—This runs a slightly different course from the ordinary tubal form. The tubo-uterine pregnancy is very rare, while the ordinary tubal form is compara-

tively common. Ross met with only one tubo-uterine pregnancy in a series of 45 cases; Taylor one in 42; Tait one in 40.

The walls of the gestation sac are very thick in tubo-uterine pregnancy, while they are very thin in the tubal. While either may rupture into the peritoneal cavity the tubo-uterine may possibly rupture into the uterine cavity and be discharged through the vagina. After rupture of a tubo-uterine pregnancy hæmorrhage is apt to be very severe. Rupture of a tubo-uterine pregnancy is apt to occur later than in the ordinary tubal pregnancy, although very early rupture of the former may occur as in Ross and Bryans' case.

In this case the patient had missed one period. Sudden pain with faintness occurred at noon one day. Bryans sent patient same afternoon to the hospital and placed her under the care of Ross. Through an unfortunate misunderstanding Ross did not see her until the following morning when she was almost moribund. He operated, however, and found the abdominal cavity full of blood. It was very difficult to make out the point from which the hæmorrhage was coming. Drew up one tube, found it healthy; drew up the other tube, found it healthy, and was for a moment at a loss to know what to do. On raising the uterus he found a small spot on the anterior wall behind the junction of the round ligament with the uterine fundus. On sponging this off he could make out distinctly a small cavity about the size of a small pea with dark edges, from which the blood oozed. It was evidently a rupture of an interstitial pregnancy of very short duration. Patient died the same afternoon.

Later Rupture of the Tube.—We have here: 1. The symptoms before the rupture. 2. The symptoms arising from rupture.

If one has not seen the patient before the onset of pain with collapse he will have learned nothing as to the preexistence of tumor, etc. He may, however, learn something from the patient or her friends as to irregularity of menstruation, nausea, pains in the breasts, and other symptoms of pregnancy.

Although there may be no symptoms before early rupture, excepting a slight delay in menstruation, there are generally marked disturbances before the late rupture. Menstrual irregularity and pelvic pain should always make one think of ectopic pregnancy. If one can detect by physical examination the tubal tumor at the side of the uterus he obtains confirmatory evidence. If he can not detect such a tumor he should not conclude that there

is no ectopic pregnancy. In either case a consultation should be held *as soon as possible.*

The signs following the later rupture are similar to those before referred to in connection with early rupture—i. e., acute pain with tenderness, and collapse from loss of blood. As before intimated

Fig. 123.—Ectopic Gestation, Broad Ligament or Extraperitoneal.

Fœtus and placenta removed at ten months; principal attachment of tumor to right corner of the uterus; pedicle three inches long; Fallopian tube and ovary in pedicle one inch apart; sac had two layers, the outer thick and tough, presumably thickened peritonæum of broad ligament, the inner dead tissue containing placenta firmly attached and membranes (one layer apparently) easily separable from outer layer. Indian woman, in British Columbia, made a good recovery. (H. C. Wrinch, Tor. Univ. Museum; see Can. Lancet, Nov., 1901.)

the hæmorrhage in later rupture is in a large proportion of cases not so severe as that following the early rupture. It is well, however, to consider both forms equally dangerous, although very prompt action is sometimes more urgently needed after the early rupture than after the later.

DIFFERENTIAL DIAGNOSIS OF TUBAL PREGNANCY

Bland Sutton states the following facts: Uterine and tubal pregnancy are sometimes concurrent. Uterine pregnancy sometimes follows tubal variety. Tubal pregnancy may be bilateral. Tubal pregnancy may be repeated. Tubal pregnancy and ovarian or parovarian tumors may coexist.

Taylor says tubal pregnancies may be simulated by or mistaken for: 1. Threatened or incomplete abortion. 2. Intra-uterine pregnancy complicated with pelvic tumor. 3. Retroflexion of the gravid uterus. 4. Anteflexion of the gravid uterus. 5. Pyosalpinx. 6. Myoma. 7. Twisted pedicle tumors: (*a*) Of the tube, (*b*) of the ovary.

I have made a slight modification of Taylor's list in using the words "threatened or incomplete" instead of "simple" abortion.

Threatened or Incomplete Abortion.—The symptoms of normal pregnancy and ectopic pregnancy are similar in many respects. In both there may be amenorrhœa, morning sickness, pains in breasts, constipation, etc. Symptoms of abortion may occur in either case —viz., irregular uterine hæmorrhages, passage of membranous clots, abdominal pains, etc. We must now rely on physical signs as discovered by bimanual examination with bladder and rectum empty. Frequently the administration of chloroform is necessary.

In abortion the tumor of pregnancy is central and continuous with the cervix. There is no uterine body apart from the tumor. The back and sides of the (uterine) tumor are free from any abnormal swelling. There are no pulsating vessels felt in vaginal vault at one side of uterus. The discharges of blood are often copious and bright red in color, coming sometimes in gushes, alternating with the passage of clots. The uterus is enlarged in proportion to the age of the pregnancy.

In ectopic pregnancy the tumor is on one side of the uterus and distinct from ovary. It is not continuous with the cervix. The uterine body may be felt apart from the tumor. The tumor appears to be at the side of or behind the uterus. Pulsating vessels are sometimes felt in vaginal vault. The discharges of blood are not generally copious, fairly thick in consistence, steady in their rate of flow as long as they last. The uterus is only slightly enlarged.

Intra-Uterine Pregnancy Complicated with Pelvic Tumor.—It is well to have the possibility of such a condition always in one's mind. It is sometimes impossible to reach a definite conclusion even after a careful bimanual examination. When in doubt wait for a time. If it is found at one or more subsequent examinations that the uterus is enlarging while the adjacent tumor remains stationary or nearly so, the pregnancy is intra-uterine.

Retroflexion or Retroversion of the Gravid Uterus.—A peritubal hæmatocele situated behind the uterus or a retro-uterine broad ligament pregnancy, as felt by vaginal examination, is very similar to retroflexion of the gravid uterus. By careful bimanual examination the fundus uteri can usually be felt immediately above the pubes. A discharge of blood without accompanying labor pains is more common in ectopic pregnancy than in a retroflexed gravid uterus. Retention of urine is more common in retroflexed gravid uterus.

The difficulty of differential diagnosis is sometimes so great that the importance of the following rule given by Taylor should be recognized: Never diagnose a gravid retroflexion without careful exclusion of ectopic pregnancy.

Pyosalpinx.—Double pyosalpinx or collections of pus in both Fallopian tubes may closely simulate a tubal pregnancy. With the pyosalpinx we generally have regular menstruation with perhaps menorrhagia or occasional metrorrhagia. Occasionally, however, there is complete amenorrhœa. The preceding condition of health may help to clear up matters. A history of purulent vaginal discharge followed by pelvic pains would furnish evidence pointing to pus tubes.

Myoma.—Sometimes a tubal pregnancy simulates very closely a uterine myoma. The tubal pregnancy is more apt to cause pain, especially when there is a peritubal hæmatocele. A myoma in or projecting from the side of the uterus is seldom painful even when handled.

Twisted pedicle tumors, whether of the tube or ovary, produce serious symptoms. When the pedicle becomes so far twisted as to obstruct the circulation the symptoms closely resemble those caused by a rupture of a tubal pregnancy. In such cases, however, the twisted pedicle tumors do not appear to be so closely connected with the uterus as the tubal pregnancy.

In giving these points as to differential diagnosis I have closely

followed Taylor. Although good in a way, they are necessarily incomplete. No one can give directions by which we can with certainty reach a diagnosis in all cases. Pregnancy in a rudimentary horn of a bilobed uterus occasionally occurs. Rupture is not delayed beyond five months.

GROWING PREGNANCY, FULL TERM PREGNANCY, DEAD PREGNANCY

Tubo-Abdominal Variety.—The symptoms and treatment of other forms are the same as in tubal pregnancy. While pregnancy within the abdominal cavity is going on after tubal rupture, and especially after the fourth month, we have chiefly noticeable the ordinary signs of uterine pregnancy. Careful examination, however, will always show certain differences between the normal and the misplaced pregnancy. In abdominal pregnancy the fœtus and placenta are probably "rather lateral or zigzag in position." The sac of pregnancy is not, as a rule, distended by liquor amnii. The fœtal movements cause serious pain. The fœtus may be mapped out very easily, the limbs may be sometimes isolated and grasped. The fœtal heart is sometimes peculiarly accessible and clearly detected. In placing the hands over the abdomen there is not found any expanding and contracting of muscular fibers. On bimanual examination the cervix is generally found to be soft and patulous, the uterus is generally displaced toward one side of the pelvis, only slightly enlarged and obviously distinct from the child. In tubo-ligamentary pregnancy, however, the uterus is more enlarged and not obviously distinct from the child.

It sometimes happens that in a normal intra-uterine pregnancy we may find symptoms very similar to those described when the walls of the uterus are unusually thin. An extraordinary thinness of the uterine walls is sometimes found with or without hydrosalpinx. I think it is Cullingworth who reports a case where abdominal pregnancy was supposed to exist, the real condition, however, of intra-uterine pregnancy, was only discovered after abdominal section.

Growing Tubo-Ligamentary Pregnancy.—In a large proportion of cases of intraligamentous pregnancy the posterior layer of the broad ligament is the one chiefly displaced by the growing ovum—that is, the pregnancy is really retroperitoneal not subperitoneal.

There is, in such cases, a hardness and fixity of the tumor which is not found in the abdominal pregnancy. The uterus in such cases is considerably enlarged and closely attached to the sac of the pregnancy. It is generally somewhat difficult to make a diagnosis. It is especially difficult to make a differential diagnosis from intra-uterine pregnancy, pregnancy in one side of a double uterus and pregnancy in one horn of a bicornuate uterus.

Full Term and Dead Pregnancy; False Labor.—When an ectopic pregnancy reaches full term certain symptoms appear which generally give the patient the impression that she is in labor. As delivery can not occur without artificial assistance the term "false labor" is applied to the phenomena which appear at this time. The patient has pains which are not due, however, to uterine contractions, but to the movements of the fœtus. There is generally some vaginal discharge and sometimes expulsion of decidual membranes. The pains usually last some days and are sometimes quite distressing. They then cease suddenly, as a rule, and the movements of the child, now dead, are no longer felt.

This is sometimes called "*missed labor.*" After this the breasts temporarily enlarge and secrete milk. After a short time all the symptoms of pregnancy, except the enlargement of the abdomen, disappear.

Results. 1. The liquor amnii may be absorbed and the soft parts may become adipocere.

2. The fœtus may remain unchanged for many years.

3. The fœtus may shrink, calcareous matters be deposited, producing a lithopædion.

4. Suppuration in sac may occur, causing septicæmia.

Treatment During the First Four Months of Pregnancy.—Fortunately there is but little difference of opinion as to treatment. Obstetricians generally agree that the proper treatment is operative. In all cases of unruptured ectopic pregnancy and all intraperitoneal ruptures the operation of abdominal section should be immediately performed. It is true that occasionally a patient having a tubal mole with a peritubal hæmatocele, or a ruptured tubal pregnancy, recovers without operation. The proportion of such recoveries, however, is very small, about 5 per cent., according to Taylor. We ought certainly to take no chances where the odds are so overwhelmingly against the patient.

It requires considerable courage to operate as Ross did in the

case I have reported. Algernon Temple showed similar courage when he went to Hamilton, about four years ago, and operated on Mrs. ——, a daughter of a prominent physician of that city. Although the patient was apparently in extremis she made a good recovery, much to the surprise of Temple himself and those present. Cullingworth operated once under apparently hopeless circumstances after the patient had been for some hours "pale, cold, restless and pulseless. The operation lasted half an hour. No pulse could be felt during the whole of that time or for three hours afterward." Recovery.

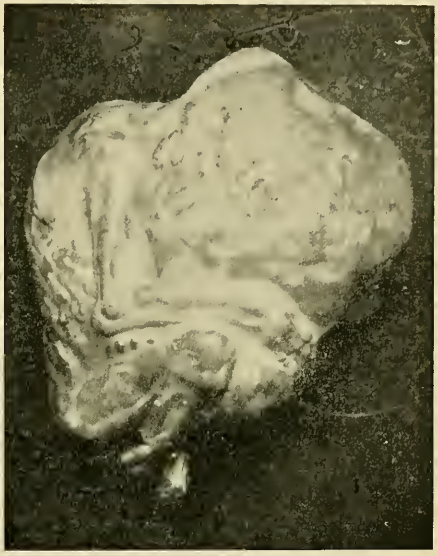


Fig. 124.—Ectopic Gestation.

Lithopædion retained in abdomen seven years. (W. H. Taylor, Tor. Univ. Museum.)

A few years ago efforts were made to destroy the embryo in the misplaced pregnancy by evacuating the liquor amnii, by injection of fluids into the sac, and by the use of electricity. Such methods have fallen into disrepute and are now practically obsolete.

Mistakes are made in diagnosis. There may be, for instance, a history indicating ectopic pregnancy, and a mass beside the uterus easily felt by a vaginal examination. In such a case the operation is indicated whether this mass be an ectopic gestation sac, a pyosalpinx, or a hydrosalpinx.

In urgent cases—that is, when rupture has occurred—the accoucheur should immediately send for assistants and also make preparations for operation. Elevate the foot of the bed or the hips of the patient, administer an enema of saline solution, using one pint, inject a quart of normal saline solution under the breasts. Give hypodermics of strychnia, $\frac{1}{60}$ of a grain every hour for five or six doses. Some give larger doses of both but I prefer to be careful when there is so little reserve force to draw on. Apply hot-

water bags or bottles to the sides of the body and extremities. Get ready clean towels, bed linen, etc., douche bag, clean basins, sterile water, hot water, antiseptics, iodoform gauze, etc. A description of the operation is given on page 563.

Subperitoneal Rupture.—While it is generally admitted that an operation is indicated in all cases of unruptured ectopic pregnancy, and also in all cases of intraperitoneal rupture, there is some difference of opinion as to the treatment of subperitoneal rupture. In this form the symptoms are not so acute as in the intraperitoneal variety, the hæmorrhage being restricted by the surrounding structures. In many cases the embryo speedily dies, while it and the blood thrown out are absorbed in a comparatively short time. Some prefer to treat this class of cases on the modified expectant plan—i. e., keeping the patient quiet, watching her carefully, and interfering if serious symptoms arise. I prefer in such cases non-interference unless the symptoms become serious either from excessive hæmorrhage or sepsis.

Others think that the immediate removal of the gestation sac is the proper treatment, especially in view of the possibility or probability of sepsis, and on account of the severe pain generally present. If, when the patient is first seen, considerable time has elapsed since the rupture, she may be practically convalescent. Under such circumstances an operation is needless. In other cases she may be suffering from complications which should receive suitable treatment.

CHAPTER XV

HÆMORRHAGE BEFORE, DURING AND AFTER LABOR

The various forms of hæmorrhage occurring before, during and after labor produce some of the most acute emergencies which are encountered in obstetrical practise. A very careful study of this subject is important, not only on account of the serious results which frequently follow, but also because, even in the worst cases, prompt and correct treatment will generally prevent a fatal issue.

HÆMORRHAGE BEFORE LABOR

The hæmorrhages which occur before or during labor are generally due to one of two causes.

1. Partial or complete separation of a normally situated placenta (accidental hæmorrhage).

2. Abnormal situation of the placenta (placenta prævia).

In exceptional cases the hæmorrhages are due to: 1. Cancer, most frequently of the cervix. 2. Rupture of a varix.

We thus have four varieties, two ordinary and two exceptional: 1. Accidental hæmorrhage. 2. Hæmorrhage from placenta prævia. 3. Hæmorrhage from cancer of the cervix. 4. Hæmorrhage from a ruptured varix of the vulva or vagina.

ACCIDENTAL HÆMORRHAGE

This is hæmorrhage caused by premature detachment of the normally inserted placenta, or "ablatio placentæ." The separation may be complete or (generally) partial. The supposed causes are: predisposing; endometritis, diseased placenta; exciting; an accident; unusually strong contraction of the uterus; short cord; great distention of the uterus as from plural pregnancy.

Varieties.—The varieties of accidental hæmorrhage are: 1. External accidental hæmorrhage. 2. Concealed accidental hæmorrhage.

In the external form the blood finds its way between the mem-

branes and the decidua and escapes from the vagina. The symptoms are: escape of blood from the vagina, escape of serum from the vagina, the usual symptoms of hæmorrhage.

Diagnosis of External Accidental Hæmorrhage.—When the blood appears externally it is generally due to either accidental hæmorrhage or to hæmorrhage from placenta prævia. If it is found by abdominal palpation that the head presents and is fixed in the brim it is almost certainly not placenta prævia. If it is found by vaginal examination that the presenting part can be felt as well as usual and no placenta can be felt in the lower uterine segment it is not placenta prævia.

Concealed Form.—In the concealed form the blood fails to pass externally and is retained between the ovum and the uterine wall, or passes through the ruptured membranes into the interior of the ovum. The symptoms are: irregularity and feebleness of the uterine contractions, the fundus only contracting; the syncope and collapse are more severe and persistent than ordinary fainting; the uterus is very sensitive; the pains are of a tearing character; the uterus is increased in size (sometimes); palpation of the uterus is difficult or impossible.

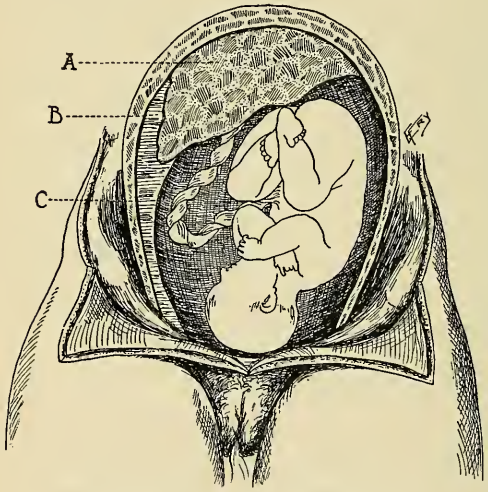


Fig. 125.—Accidental Hæmorrhage.

A, Placenta mostly attached, partly separated; *B*, site of separation; *C*, blood passing down between the membranes and the uterine wall.

Differential Diagnosis of Concealed Accidental Hæmorrhage.—It is most likely to be mistaken for rupture of the uterus or rupture of a sac in ectopic pregnancy. The symptoms occur more early than in ruptured uterus, and are not, as a rule, preceded by such strong pains. In ruptured uterus the child often recedes into the abdominal cavity. In ectopic gestation the sac generally ruptures early in pregnancy.

Prognosis of Concealed Form.—The prognosis is grave, the mortality of mothers being about 50 per cent., and that of the children being still greater.

The pain and rapid collapse in cases of concealed accidental hæmorrhage are remarkable. This collapse is supposed by some to be due entirely to the loss of blood. It is likely, however, that the collapse is due as much or more to the extreme pain than to the outpour of blood. There happens to be quite a difference of opinion on this point and I think much misconception. Take, for instance, the opinions of certain British authors. Jellett tells us that "collapse, falling temperature, weak and rapid pulse, severe abdominal pain, anæmic appearance—*all occur in proportion to the amount of blood which the patient is losing.*"

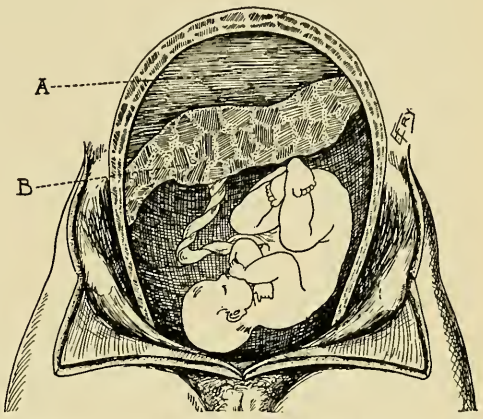


FIG. 126.—ACCIDENTAL HÆMORRHAGE CONCEALED.

A, Blood retained between the placenta and the uterine wall; *B*, placenta separated at center with adherent margins.

Galabin, in discussing this subject, says in one place that "the patient may die from hæmorrhage undelivered"; but in another place he refers to the additional "element of shock through the distention of the uterus," and then goes on to say that "the very fact of the uterus allowing such distention proves that its walls are feeble or not prone to contract."

Herman attaches much importance in such cases to the "sudden stretching" of the uterus, the acute pain which results therefrom and the extreme prostration which is thus produced. My own views as to the predominant importance of the amount of blood lost have been changed in recent years, chiefly through a careful study of the following cases.

Case I. Mrs. A. III para. About three weeks before full term slipped while climbing a fence. Some abdominal pain and a feeling of faintness for a short time. Next forenoon suddenly seized with a severe abdominal pain. Physician and nurse summoned. The former found no sign of

labor, did not appreciate the significance of the extreme pain, and left the house. Thus much valuable time was lost. The patient grew rapidly worse. Late in the afternoon was delivered of a dead child and a large quantity of blood followed. Mother died a few minutes later.

Case II. Dr. W. P. Caven's patient. Mrs. B., aged thirty-three. IV para. Labor pains commenced at midnight, strong at 8 A. M. Seen by Caven at 9.30. Then in a state of collapse. Dr. McKenzie, Dr. Ross and I were summoned. Patient anæsthetized and delivered (*accouchement forcé*) at 11.30. Considerable blood, mostly in clots, expressed. Patient died one hour after delivery. Dr. McKenzie expressed his surprise that the quantity of blood poured out (about one quart) produced such serious results. I myself had seen more blood lost in cases of post-partum hæmorrhages without fatal results, and suspected some form of shock, apart from collapse due to mere loss of blood, was in a measure responsible for the death of the patient.

Case III. June, 1902. Mrs. C., II para, aged twenty-nine. When about seven months advanced in pregnancy was suddenly seized with severe abdominal pain, while driving, after a *jar* caused by the carriage wheel passing over a stone. Went home (only a short distance) as soon as possible. Went up-stairs intending to go to bed, collapsed while undressing. Saw her in about twenty minutes and found her cold and weak, pale, with rapid pulse, and suffering intensely from "tearing" pains over the abdomen, especially near the right iliac region. Gave her two doses of nepenthe within a few minutes. Second dose gave some relief but she was still suffering greatly at the end of an hour and I then gave her a hypodermic of morphine. This gave more relief and in about three hours after the collapse she was nearly free from pain. Remained in bed three days feeling fairly well. Motions of child felt up to time of collapse but not after. Four days after the accident labor commenced. Dead babe born in fourteen hours, followed by some clots. The placenta showed evidence of being about half detached for some days. In this case the shock and collapse were evidently due to the tearing pains caused by the sudden stretching of the uterus, and not at all to the loss of blood, which did not amount to more than one pint.

Case IV. Patient seen with Dr. Allen Baines at 11 A. M. Apparently in labor, great pain over uterus, some shock, no expulsive uterine contractions, only slight dilatation of the os. Chloral given. Normal labor pains commenced about noon and child born dead about 5 P. M. A large clot followed expulsion of the placenta. Although I am sure from what Dr. Baines told me that this clot was much larger than that found in Case III, the symptoms of pain and shock were not so severe.

Albert Macdonald reported two cases to the Toronto Medical Society in 1892. In both the patients during the greater part of pregnancy had continuous severe pain over that portion of the

uterus which he found to correspond with the placental site. Both patients recovered.

It is strange that the sudden escape of a pint of blood from torn vessels beneath the placenta or membranes should produce such a profound effect on the whole system as in my case, III. The pregnant uterus, with its great nerve and muscle developments, becomes a very powerful but exceedingly sensitive organ. We have found that under certain abnormal or unusual conditions, such as premature escape of the liquor amnii or prolonged labor from any cause, serious results follow, such as tetanic contraction, frequently accompanied by agonizing pain. In case of accidental concealed hæmorrhage the sudden stretching of the uterus by the invading blood produces a great effect on some of the uterine nerve plexuses and thence immediately on the whole body somewhat similar to that produced by a sharp stroke of a cricket ball in the neighborhood of the solar plexus. In certain of the so-called *fulminating* cases the symptoms are much like those produced by hæmorrhage into the substance of the pancreas, which, although insignificant in amount, sometimes causes death in an hour or two, as happened to a patient of Dr. Allen Baines recently. Thus we have shock rather than collapse, or frequently both—shock from the sudden stretching together with collapse from loss of blood, the former predominating in certain cases. Many who have accepted the opinion of Galabin think that the distention of the uterus under such circumstances proves that its walls are enfeebled by some previous disease, such as advanced metritis. I know nothing about such weakness of the uterine wall. In the cases I have met I thought the uterine wall had its normal tone and supposed the resisting power in it was the chief factor in the symptoms produced.

I have not referred to other cases where I have found small blood clots of two to four ounces beneath the placenta, but I believe these somewhat insignificant-looking masses often produce very severe pains before the onset of labor, and that such pains are continuous in character and frequently last for several hours, the true cause being seldom suspected. One should always think of this condition when he meets patients suffering from sharp abdominal pain, colic-like in character, at or toward the end of gestation.

TREATMENT FOR EXTERNAL HÆMORRHAGE

When the hæmorrhage is only slight, rest and quiet, with the administration of opium and viburnum prunifolium as recommended for the treatment of threatened abortion, may prevent any further serious symptoms. This is apt to be the case when only a small portion of the placenta is detached. Patients under such circumstances ought of course to be very carefully watched.

Active Interference.—When interference becomes necessary we have to consider two conditions. In the one case there is no sign of even the commencement of labor, while the hæmorrhage is copious. In the other case the patient is in labor and the parts are wholly or partially dilated.

The following rules will cover the two varieties:

1. Plug the vagina if the os is undilated and the membranes are unruptured.

2. Puncture the membranes and deliver as soon as possible if the patient is in labor and the os is wholly or partially dilated.

The Dublin Method.—The following is a brief description of the Dublin method, which is only to be employed when severe hæmorrhage occurs before labor with os undilated and ovum intact—i. e., when the membranes are unruptured. Plug the vagina tightly, using antiseptic methods. This will do three things: 1. Check the hæmorrhage. 2. Bring on labor. 3. Give time to rally from shock if present.

Leave the plug in until strong labor pains ensue, usually in from three to four hours.

In some cases the onset of labor may be slower and then plug must be removed after twelve hours for fear of decomposition. (I am using mostly Jellett's words, but utero-vaginal tamponade is discussed and described in another chapter and the opinion is expressed that an antiseptic plug may be left in the vagina or even the uterus for a much longer time.) If hæmorrhage comes on again another plug must be introduced, but this is usually unnecessary. I approve of this method, although some authors tell us that such treatment is wrong. Galabin tells us "the membranes should be punctured as soon as possible." "Plugging the vagina is considered inadmissible in cases of accidental hæmorrhage because concealed hæmorrhage might be going on behind the plug." Dakin tells us that after the introduction of a sponge tent into the

cervical canal when "the uterus begins to distend and the woman to show signs of fresh loss of blood it will be obvious that the case is one of accidental hæmorrhage, which the tent has converted into the concealed variety." Fothergill, speaking for Edinburgh, tells us that "plugging the vagina must be carefully avoided in accidental hæmorrhage. The site of bleeding is too high up to be affected by this kind of pressure and its only result is to convert external into concealed hæmorrhage."

These are high authorities, representing the soundest and most conservative obstetrical elements of London and Edinburgh, and their statements deserve careful consideration. I think, however, that Dublin in this instance is right, and that the results of the tampon treatment in the Rotunda during the last eleven years; under the masterships of Smyly and Purefoy, prove that such is the case.

Rupture of the Membranes.—Consider the alternative procedure as recommended by so many—puncture of the membranes. Rupture of the membranes before the onset of labor is dangerous in the extreme. By the decrease of the intra-uterine pressure the hæmorrhage is increased up to the time of the onset of the uterine contractions of labor. In a large proportion of cases the puncture of the membranes increases the hæmorrhage and causes such serious symptoms that *accouchement forcé* or removal of the uterus becomes necessary. So far as I know, Albert Macdonald was the first in this province to enter a decided protest against rupture of the membranes for accidental hæmorrhage before the onset of labor.

Another feature of such cases is important. Frequently the accoucheur will be unable to decide whether the hæmorrhage is accidental or unavoidable because he can not pass the finger through the undilated os. If, however, he believes that the tampon is suitable for any form of uterine hæmorrhage before rupture of the membranes a grave cause of perplexity is removed.

Rapid Delivery When Os is Fairly Well Dilated and the Membranes Are Unruptured.—After labor has commenced, especially if the os is fairly well dilated, it is better to complete delivery as soon as possible. This is not difficult as a rule after labor has commenced. Let an assistant anæsthetize the patient to the surgical degree, and then dilate thoroughly the vagina. Generally when the whole hand is carefully introduced into the vagina the cervix

has become dilatable. The dilatation of the vagina generally stimulates uterine contractions if labor has begun, and in accordance with the laws of polarity such contractions tend to produce dilatability of the os. One should be careful in dilating the os because the cervix is sometimes very rigid and easily torn, although such danger is not nearly so great as in cases of placenta prævia. After dilatation of the soft parts, the proper procedure is to turn at once if the head presents and extract. Occasionally, when the head is engaged in the brim or has entered the pelvis it is better to deliver with the forceps.

TREATMENT FOR CONCEALED HÆMORRHAGE

I think that the serious symptoms caused by this accident should be placed in the same category with symptoms produced by other varieties of nerve storms which occur during pregnancy or labor, such as those which cause eclampsia or tetanic contraction, and should receive similar treatment.

Treat first the shock by the administration of morphine, chloroform, stimulants, and the application of heat externally. I have found nepenthe or morphine by the mouth too slow in action. Administer $\frac{1}{2}$ grain of morphine hypodermically—follow with $\frac{1}{4}$ grain every half hour for two or three doses if required, also chloroform if pains are not relieved by the morphine. If symptoms are very severe and there is a nurse or physician as assistant let one at once commence to administer chloroform while the other gives the hypodermic injection of morphine. Minutes —even seconds—are valuable. Severe pain sometimes kills in a very short time. If alone send for a consultant, but don't wait for his arrival. Give morphine and chloroform at once. With reference to Case II, I have often thought that if Dr. Caven had seen his patient one-half hour sooner he could have saved her life. If patient has not reached full term and is not in labor, further immediate interference in many cases is unnecessary as in Case III.

If labor has commenced always deliver as soon as possible. Dilate the soft parts by first introducing the hand into the vagina and then the fingers into the cervix. Bring down a leg or apply forceps and deliver as before directed. If labor has not commenced but symptoms remain very severe, notwithstanding the administration of morphine and chloroform, empty the uterus as soon as possible.

PLACENTA PRÆVIA

When the placenta is situated in the lower segment of the uterus—i. e., close to or over the internal os—it is said to be *prævia*. Its frequency is about 1 in 700 cases. In this unusual position the placenta is thinner and the placental area larger than normal, and placentæ succenturiatæ are more common.

Two varieties are given—i. e., complete and incomplete; but these do not cover the ground as to the position of the placenta. The important point is that the placenta is situated near or over the internal os. It may thus be marginal or lateral, the edge being within a short distance from or just reaching the os, or it may cross over the os and simply touch the edge beyond the os, or it may cross further until the center of the placenta corresponds nearly or exactly to the internal os. The source of the blood is generally admitted to be the torn vessels and sinuses in the uterine wall.

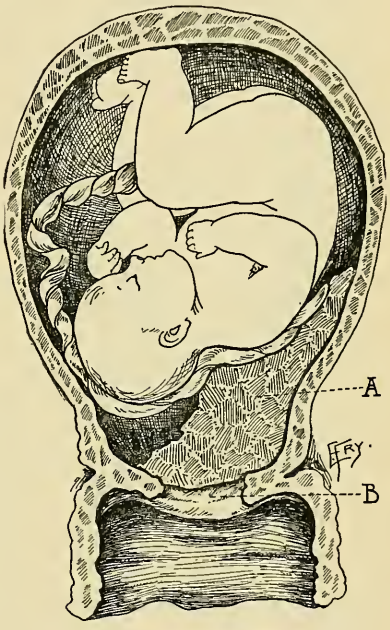


FIG. 127.—PLACENTA PRÆVIA.

A, placenta in lower segment covering the os and touching the edge beyond the os; *B*, os uteri.

Symptoms.—The most ordinary symptom is the hæmorrhage ("unavoidable"), which may come on at any time, especially in the later months of pregnancy. It may commence after unusual exertion or an accident, but it not infrequently begins while the patient is quiet in bed. The patient generally goes through the first half of pregnancy without abnormal symptoms. The hæmorrhage is most apt to appear first during the seventh or eighth month. It begins earlier where there is central implantation (usually from the twenty-eighth to the thirty-fourth week) and later when there is lateral implantation (usually after the thirty-sixth week). Early hæmorrhage is

generally more slight than that occurring later. When the first hæmorrhage commences during labor it is generally copious.

There are in severe cases the ordinary constitutional symptoms of hæmorrhage: pallor, cold skin, irregular respiration, thready pulse, air hunger, thirst, jactitation, tinnitus aurium, nausea, dimness of vision, and syncope.

Some (including Spiegelberg) think that the hæmorrhage is always checked to some extent during the acme of a pain. Others think the hæmorrhage is increased during pains. There is really no fixed rule in either direction.

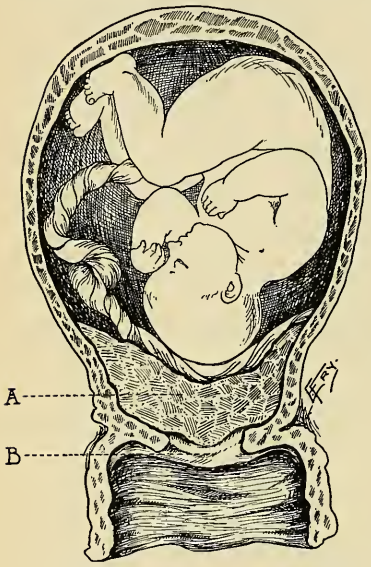


FIG. 128.—PLACENTA PRÆVIA.

A, complete placenta prævia, center of placenta over os; *B*, os uteri.

Diagnosis. — Vaginal stethoscopy as an aid to diagnosis was proposed several years ago and tried by some. I think, however, such procedure is now practically obsolete.

The diagnosis is sometimes difficult or impossible before dilatation of the os. Some think they can occasionally discover the position of the placenta by abdominal palpation when it is situated on the anterior uterine wall by noticing that the fœtal parts are felt less distinctly over the placental area. The only certain proof of the condition is obtained by vaginal examination, passing one or two fingers through the cervical canal, and feeling either the edge of the placenta near the internal os, or the placental tissue if it is situated over the internal os.

Premature Labor.—Premature labor is the rule in placenta prævia. Labor usually follows hæmorrhage. The pains are apt to be comparatively weak on account of the situation of the placenta, which disturbs the polarity of the uterus and prevents the proper action of the presenting part on the cervix, and because the patient is often exhausted by hæmorrhage. Transverse presentations and imperfect flexion of the head are common.

As labor advances and the advancing membranes gradually

produce dilatation, the placenta when situated over the os becomes partially detached. As the *prævia* is seldom exactly central complete detachment takes place first on one side of the internal os—i. e., on the side where the smaller portion of the placenta is situated. Thus the central *prævia* becomes converted into the marginal or lateral. When the placenta is originally marginal or becomes so by Nature's work or by artificial interference, the head or breech may press against the placenta if the uterine contractions are strong or fairly strong and stop the hæmorrhage. At the same time the separation or detachment of a portion of the placenta allows retraction of the uterus to occur and this tends to stop the hæmorrhage. Occasionally the central prævia is not converted into a lateral or marginal one. Instead, the placenta is wholly detached and driven down before the child. In such cases the patients generally do well, but the children are nearly always still-born.

Prognosis.—Formerly the maternal mortality was from 25 to 40 per cent., but by improved methods of treatment, including aseptic and antiseptic precautions, it has been reduced to 5 to 10 per cent. The mortality as to the children is perhaps greater under the new methods than it was under the old, although Herman's statement that the mortality of the children has increased from 60 to 90 per cent. under our new methods is somewhat surprising, and is not correct with regard to Canada and the United States.

TREATMENT OF PLACENTA PRÆVIA

Perplexities of Physician.—So much depends on the symptoms, especially as to the quantity of blood lost, and there is such a difference of opinion on certain points, that no definite rules which will be acceptable to all can be given. I shall suggest rather concisely the following rules:

When the hæmorrhage commences before the child is viable be guided by the character of the hæmorrhage.

If the hæmorrhage is slight carry out the expectant plan of treatment—i. e., keep patient quiet in bed, keep bowels fairly open, give opiates and viburnum as required.

This advice is condemned by many able and conscientious obstetricians who say that the mother is never safe under such circumstances, as a fatal recurrence of hæmorrhage may occur at any

time. This is true, but at the same time the fact remains that a fatal hæmorrhage before the child is viable is rare. One should, however, always recognize the element of danger under such circumstances and watch the patient with the greatest of care. If the patient is five to ten miles away from her physician the peril to her is still greater.

Let us consider the matter from the other side—i. e., in the interest of the unborn babe. Some of us think that a six months' fœtus has certain rights which can not be legally or morally disregarded. The mother may have certain views about the life of the "expected" little one. The courts may require the physician to "show cause" for the induction of an abortion. The church may ask why he has deliberately destroyed an unborn babe. The perplexities of such a situation are very serious. One should study each case carefully in all its aspects and get the assistance and advice of a consultant.

If, on the other hand, one finds the hæmorrhage so copious as to endanger the life of the mother he should endeavor to control the hæmorrhage and empty the uterus as soon as possible. Even if he could keep the mother alive for a few weeks the chances of the birth of a living child would be so infinitesimal as to be scarcely worthy of consideration. If hæmorrhage commences about the time the child has become viable the situation is preeminently perplexing. In such a case Herman's statement that " in placenta prævia the life of the mother and that of the child are antagonistic" is nearly, if not altogether, correct.

The safe procedure, under such circumstances, is to induce premature labor in the interest of the mother. Still, in my own practise I do not always adhere rigidly to this rule. If hæmorrhage is only slight and I have the impression that the child is only barely viable I sometimes carry out the expectant plan—I mean the carefully watchful expectant plan.

I think that in such a case one should take counsel, not only with a consulting accoucheur but also with the husband and wife, and that he should at the same time respect the scruples of the church, which upholds God's law—" Thou shalt do no murder." If one decides to wait for a time the patient should be placed in a hospital if possible, or a competent nurse should be secured to watch her carefully if she remains in her own house.

If hæmorrhage commences toward the end of eighth or in the

ninth month of pregnancy one should induce premature labor if labor has not already commenced. In a large proportion of these cases labor commences soon after a hæmorrhage. If this happens while one is waiting in doubt as to his correct course all perplexities as to choice will be removed.

Methods of Procedure.—Before referring in detail to certain methods of procedure it may be well to consider some facts as to the condition of the lower uterine segment and cervix. Placenta prævia causes a congestion and softening of the lower segment, which makes it easily torn. In a certain minority of cases it appears to be like wet blotting paper.

The condition of the cervix varies greatly. In the majority of cases it is quite soft and dilatable. In about 12 per cent. of cases, however, according to Müller, it is abnormally rigid. In any case copious hæmorrhage nearly always causes some dilatation of the cervix, but manual or instrumental stretching, although easily accomplished, will often cause rupture before it produces further dilatation, and such rupture readily extends into the softened lower uterine segment.

When interference is deemed necessary, our methods will depend on the conditions present.

1. When there is serious hæmorrhage, with only slight dilatation of os and no sign of labor, the proper procedure is to induce labor. Krause's method, by the introduction of one or two flexible bougies, is not suitable. Vaginal tamponade, as recommended for accidental hæmorrhage while the ovum is intact, is the correct procedure because here again it not only brings on labor pains but it also controls the hæmorrhage. It is advisable then to apply tightly an abdominal bandage. After the removal of the plug in from ten to thirty hours there will probably be considerable softening of the cervix and increased dilatation of the os.

2. When there is serious hæmorrhage, with the os dilated sufficiently to admit two fingers, the following is recommended:

Braxton Hicks' Method.—Turn by the combined method and bring down a leg in the case of ordinary head presentation; then leave to Nature. Such is a description of the method in a few words. Two gross errors frequently creep into the practise of this method. Many practitioners do not wait long enough to allow Nature to sufficiently dilate the os. Some wait only for fifteen to thirty minutes, but the only safe plan is to wait for hours if neces-

sary until regular uterine contractions have partially expelled the child. A few months ago an excellent and careful practitioner of Toronto was conducting a case. The mother was especially anxious to have a living child, as he knew. The foot was protruding from the vulva. The pressure of the breech was effectually preventing hæmorrhage. Everything seemed favorable, but delay might mean danger to the child. Consequently, gentle traction was used and the child born alive. The result to the mother was rupture of the uterus and death in a few hours.

Dr. Bascom, of Parkdale, recently placed a patient with suspected placenta prævia under my care in the Burnside. She had two hæmorrhages before and one after admission. Pregnancy was advanced nearly eight months. August 13th, 4 P. M., an examination was made during the third hæmorrhage, the patient being fully anæsthetized. There was a central placenta prævia and the cervix was sufficiently dilated to admit two fingers easily. I separated the placenta around the internal os, but could not reach its edge in any direction. I then pushed two fingers through the placenta, turned by the combined method and brought down a foot. Slight traction was made on the foot until the child's body acted as an efficient plug. The patient was then carefully watched, but there was no further interference. Ordinary labor pains came on about 2 A. M., and child and placenta were delivered at 4 A. M.—i. e., twelve hours after version. No hæmorrhage during the twelve hours while the foot was outside the vulva with a clean bandage fastened with a clove hitch around the ankle, and an antiseptic pad over the foot and vulva. Not more than an ounce or two of blood lost during delivery of placenta.

The second error is to neglect the child and allow it to be stillborn. Wait patiently until the cervix is dilated. Watch carefully while the child is being expelled, and as soon as it is born as far as the umbilicus interfere promptly and aid further delivery by the methods described for ordinary breech labors. If these methods are carried out the infant mortality will not be 90 per cent.

In cases of complete placenta prævia one may not be able to pass the two fingers past the edge of the placenta on either side of the internal os. In such a contingency pass the finger round the whole circumference within the os and separate the placenta as far as possible, by Barnes' method. If this does not improve matters

push two fingers through the placenta, or a long curved artery forceps, or some suitable blunt instrument first, and then dilate the opening thus made with the fingers as recommended by Garrigues. Then pass the fingers up and bring down a leg, use traction until breech, by its pressure, stops hæmorrhage, and then wait and at the proper time help as before described.

The Use of Champetier de Ribes' Bag.—Instead of Braxton Hicks' method, many use De Ribes' unyielding bag or Voorhees'

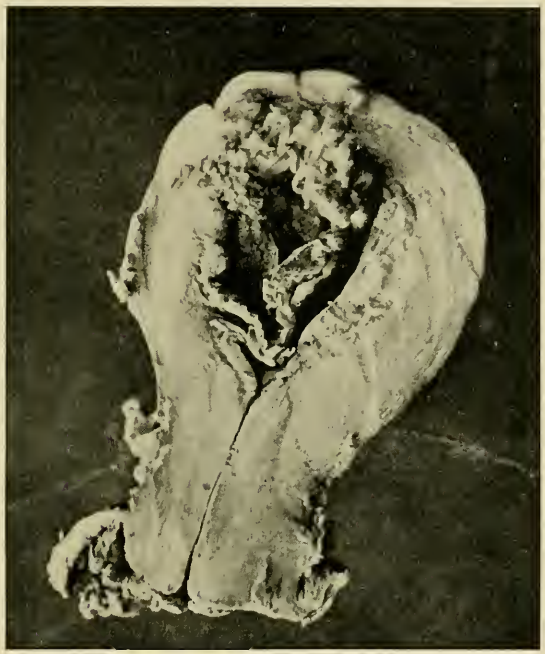


Fig. 129.—Cancer of Cervix with Pregnancy.

Half showing membranes, early stage of placental formation but no embryo.

dilating bags. The directions are: Rupture the membranes and introduce the bag if possible through the rupture and fill it with water. Pull on the bag gently but continuously. A small weight may be attached to it by a cord passing over a pulley at the foot of the bed. Hæmorrhage is thus controlled and the cervix gradually dilated. When the distended bag comes away apply forceps and extract, or turn and bring down a leg as before described.

This is thought by some to give the child a better chance than Hicks' method. In some of the New York Maternities this is the method commonly employed in such cases. It is more difficult than the Hicks' method and more frequently followed by sepsis.

Fig. 130.—Cancer of Cervix with Pregnancy. Half containing the embryo. (Tor. Univ. Museum.)

Other Methods.—In incomplete—i. e., marginal or lateral—prævia, when labor is fairly advanced and the cervix is dilated or dilatable, rupture of the membranes and the application of a tight abdominal binder is usually sufficient. Very frequently there is imperfect flexion of the child's head. In two cases I have been able with the internal fingers to flex the head completely and then with the external hand to push the head into the brim, after which the hæmorrhage was controlled. In one of these cases Nature completed delivery in a few hours; in the other I delivered with forceps. If unable to make the head act as a tampon, and if hæmorrhage continues, turn and bring down a leg and then leave to Nature for a time as before described.

HÆMORRHAGE FROM CANCER OF THE CERVIX

This has been mistaken for hæmorrhage from placenta prævia.

Treatment.—Perform abdominal or vaginal hysterectomy.

HÆMORRHAGE FROM A RUPTURED VARIX OF THE VAGINA OR VULVA

Treatment.—Apply a ligature if bleeding vessel can be found, or apply pressure with vaginal plug of iodoform gauze, or apply pressure with pad applied to vulva and held in position with a T-bandage.

POST-PARTUM HÆMORRHAGE

There is always some hæmorrhage after the delivery of the child, although the amount of blood lost is sometimes very small. When the amount is large (a pint or more) we use the term post-partum hæmorrhage.

Varieties.—There are two varieties as to the source of the hæmorrhage: *a.* From the placental site. *b.* From a laceration of the cervix, vagina, vulva or perinæum.

1. *As to Source.*—In the great majority of cases the bleeding takes place at the placental site. On this account a serious hæmorrhage arising from a laceration of the cervix or some part below the cervix is frequently misunderstood. Some of the Rotunda men speak of these two varieties as atonic and traumatic. The word atonic is not suitable because we may have excessive hæmorrhage when there is tonic contraction and also when there is irregular contraction of the uterus. The word traumatic is quite suitable, but it is more common to apply this term to crushing or bruising, and to speak of laceration as the particular kind of traumatism which causes hæmorrhage. In many cases, if not in all, the hæmorrhage from a laceration has a more marked constitutional effect than the loss of a similar amount from the placental site. There seems here again to be an element of shock from the laceration added to the collapse caused by the hæmorrhage.

2. *As to Time.*—There are also two varieties as to time: *a. Primary*—Within six hours after labor. *b. Secondary*—Occurring more than six hours after labor.

PRIMARY POST-PARTUM HÆMORRHAGE

Causes of Primary Post-Partum Hæmorrhage.—1. Inertia of the uterus with imperfect retraction. 2. Neoplasms—myoma, etc. 3. Irregular uterine contractions (hour glass). 4. Retained portions of placenta with perhaps adhesions. 5. Natural tendency

to bleed (bleeders or flooders). 6. Placenta prævia because lower segment of the uterus has feeble contractile power.

This list of causes, while fairly correct, is not altogether satisfactory. It is generally supposed and taught that the common cause of post-partum hæmorrhage from the placental site is inertia of the uterus and especially what is called secondary uterine inertia. And yet we frequently have associated with this form of inertia tetanic contraction of the uterus, which, while sometimes favoring hæmorrhage, seldom causes copious bleeding; and, more important still, we often have a degree of retraction which will effectually prevent excessive uterine hæmorrhage.

While neoplasms and hæmophilia are causes of the hæmorrhage it is probable that fibro-myomata do not cause excessive hæmorrhage in the majority of cases.

Symptoms.—The most important and the most common symptom is the external hæmorrhage which may take place before or after the expulsion of the placenta. Along with this hæmorrhage, or even preceding it, is found the rapid pulse. At the same time the hard uterine ball can not be detected by the hand over the abdominal wall. There are present also the usual symptoms of severe hæmorrhage.

In a certain proportion of cases, however, there is no external hæmorrhage, or, as the old-fashioned midwife expressed it, no "flooding." My first midwifery case in private practise was one of this sort. My partner, the late Dr. A. N. Bethune, had charge of a patient in labor. The labor was normal and about half an hour after the expulsion of the placenta Dr. Bethune left the house. Serious symptoms appeared after his departure and I was summoned. The patient was pale, cold, faint, unconscious, and almost pulseless at the wrist. There was surely hæmorrhage. Is there any *flowing?* No—the nurse said. I placed my hand over abdomen—could feel no uterus—nothing but a big soft boggy mass. What had I here? Concealed hæmorrhage. Dr. Uzziel Ogden, my teacher of midwifery, had described this condition and told us how to treat it. Although much alarmed I promptly introduced my hand into the uterus, gently forced it through an hour-glass contraction and removed nearly two quarts of blood mostly in clots, and in other respects carried out the ordinary treatment for collapse from hæmorrhage. The patient made a slow but good recovery.

TREATMENT OF ORDINARY PRIMARY POST-PARTUM HÆMORRHAGE FROM THE PLACENTAL SITE

Prophylactic Treatment.—Many years ago we learned from the Dublin School that post-partum hæmorrhage can generally be prevented by a certain routine line of treatment which should be carried out in *every case*. Occasionally we find a scientific theorist who explains the laws of contraction and retraction and shows that these two forces will prevent hæmorrhage after the delivery of the child if we do not interfere. I believe, however, that the proper plan is to "follow down" the uterus during the expulsion of the child and "watch carefully" the uterus during the expression of the placenta and for at least half an hour after as directed in the chapter on physiological obstetrics. One should avoid violent kneading or strong pressure over the uterus, which causes great pain without accomplishing any good. One may either keep the fundus in the hollow of the palm or rub the uterus gently with one finger-tip. If the uterus enlarges to any extent one may exert a little force and endeavor to use pressure so as to squeeze out clots which have formed, and with the pressure use a certain amount of friction.

Actual Treatment.—Fortunately, one can give definite rules for treatment which are generally accepted.

Give at once one dram of fluid extract of ergot or inject some preparation of ergot or ergotine hypodermically. Always empty the uterus as soon as possible. Try first to squeeze out the clots by external friction and pressure. Porter Mathew places the tips of the fingers on the fundus and then rapidly rotates the hand with a vibratory action. This often causes contraction speedily after ordinary kneading has failed. If unable to accomplish this in a short time (say one or two minutes—a long time when a woman is bleeding to death), cleanse one hand in the lysol solution and then introduce it into the uterine cavity. Clear out all clots, rub the interior of the uterus with the finger-tips while the palm of the external hand is pressing on the uterus. While thus engaged let the nurse lower the patient's head by removing pillows; raise the foot of the bed, and apply heat to the surface. After doing this let her prepare a pint of hot saline solution for a high enema.

In the great majority of cases this will be sufficient to promote contraction and stop the hæmorrhage. If the hæmorrhage still

continues give a hot intra-uterine douche about 120° F., or as hot as the fingers (not arm) can be kept in without discomfort, using two quarts of the sterile water or boric solution. This will cause considerable burning pain in the skin near the vulva, which may be to a large extent prevented by smearing the external genitals with vaseline. If hot water is not quickly available, take a cupful of vinegar, soak some clean cotton in it, carry this into the interior of the uterus in the hand and squeeze it.

If hæmorrhage continues after the douche or after the use of vinegar consider bimanual compression and plugging the uterine cavity. The bimanual compression may be tried if the abdominal walls are not rigid, the bladder not distended, and there is no tetanic contraction of the uterus. A good form of bimanual compression is that described by Herman: Bend the fingers of the left hand on the palm and introduce the fist into the vagina and push it against the body and cervix of the uterus, while counter pressure is made by the right hand which grasps the uterus externally. Schröder introduces two fingers instead of the fist into the vagina. Sometimes the aorta may be felt and compressed against the vertebral column a little above the promontory. Such pressure shuts off half the blood supply to the uterus, and, it is said, is sometimes beneficial. I have not had good results from any of the methods of compression but it requires only a short time to make a trial, and I therefore refer to it here before mentioning tamponade of the uterine cavity.

Method of Fritsch.—Professor Fritsch has recently recommended a compression method which it is claimed speedily controls the hæmorrhage.

The accumulation of blood in the uterine cavity is expressed, and the hands are placed between the recti, which are usually easily pushed aside, so as to reach the back of the uterus, which is raised as high as possible, forcibly anteflexed and compressed against the superior and posterior surfaces of the pubes. The internal os then lies exactly above the pubic portion of the iliopectineal line. The abdominal walls immediately after delivery are easily forced behind the uterus as deeply as the pelvic brim. The resulting funnel-shaped pouch of skin and muscle is firmly plugged with folded towels, linen, or if sufficient is available with large pads of cotton-wool, until the uterus is immovably fixed against the anterior abdominal wall and the pubes. A roller-band-

age is applied over the padding, which is thus forced behind the uterus toward the pelvic inlet. The body of the uterus then lies above and in front of the symphysis pubis.

The method has the following advantages:

1. By compression of the abdominal cavity blood is retained in the upper half of the body even more effectually than by direct compression of the abdominal aorta and bandaging the legs.

2. Hæmorrhage is impossible as the uterine walls are so pressed together that the uterine cavity is obliterated.

3. Hæmostasis is immediate. If the uterine cavity is plugged large quantities of blood escape during the operation, and are absorbed by the tampon itself. Professor Fritsch has seen cases in which, after completion of plugging, the woman was found to be dead.

4. No time is lost in disinfecting the hands, as no internal manipulations are required.

5. The pad once in place, no further disturbance of the patient is necessary, and there are no uterine plugs to be removed.

Plugging.—If after a trial of all these methods the hæmorrhage continues there remains only one procedure which in my opinion is worthy of consideration. Plug the uterine cavity with iodoform gauze as first recommended by Dührssen (for technique see page 507). If afraid of the penetrability of the gauze use salicylic cotton-wool plugs. Dührssen prefers the gauze for the post-partum hæmorrhage and wool plugs when there is hæmorrhage from the lower uterine segment (placenta prævia) and cervical lacerations. If there is no contraction of uterus after utero-vaginal tamponade on account of atony of the uterus compress the fundus uteri against the tampon by the hand externally over abdomen. If hæmorrhage comes on in an hour or two after tamponade it is probably due to contraction of the uterus squeezing blood out of the gauze. In such a case remove the gauze at once.

Many years ago Robert Barnes advised the injection into the uterus of a solution of the perchloride of iron diluted with water (1 in 4) in cases of serious post-partum hæmorrhage. This is now generally considered dangerous and, at the same time, less effective than the tamponade. The late Dr. Carson used the perchloride in the case of a "bleeder." The uterine hæmorrhage stopped, but she soon commenced to bleed from the nose. The hæmorrhage from the nose continued so long that it caused quite as much

alarm as did that from the uterus. I attended this patient in her next labor, Dr. Carson having died during the interval. Knowing her history I was especially careful as to prophylaxis and prompt in carrying out the different methods which I have recommended. (I have never injected an iron preparation for uterine hæmorrhage.) After introducing the gauze into the uterus and vagina the bleeding did not stop at once. I then introduced two fingers into the vagina and pressed against the tampon, using counter pressure externally over the fundus with the other hand. This pressure was kept up for nearly three hours, with occasional intervals for rest and observation.

In another case, in the Burnside, in which there was considerable post-partum hæmorrhage after a craniotomy (dead child), we introduced the gauze tampon. Contrary to my expectations the patient died, but I thought her death was caused partly by shock from chloroform and operation, and not simply from hæmorrhage.

It is sometimes difficult or impossible to decide whether the bleeding is taking place from the interior of the uterus or from a cervical or vaginal tear, or it may be from both the interior of the uterus and a cervical or vaginal tear. In any such case utero-vaginal tamponade is suitable treatment.

Hæmorrhage in which the blood does not come from the interior of the uterus is due to some form of traumatism. Severe traumatic hæmorrhage is most commonly caused by laceration of cervix or laceration in the neighborhood of the clitoris. In any such accident ligature or suture is the most efficient method of stopping the bleeding, as a rule. Frequently, however, the ordinary tampon may be more easily introduced or pressure more easily applied. A ligature or a double ligature is often necessary for a laceration in the region of the clitoris.

TREATMENT OF COLLAPSE FROM POST-PARTUM HÆMORRHAGE

Opium.—The most important thing in the treatment of collapse after hæmorrhage from any cause is the administration of opium in full doses. As Mathew tells us—the whole aspect of the case is altered in a few minutes: the distressed countenance becomes calm, hurried respiration becomes quiet, a thready, running pulse becomes steady, the awful sense of impending calamity passes away. Give half a dram of tincture of opium by the mouth, or a quarter of a grain of morphine by hypodermic injec-

tion and twenty minims of tincture of opium by enema. Mathew thinks that the opium has a better effect when given by the mouth. I speak definitely about the full doses of opium in such cases because I have found that some practitioners are afraid to administer opiates during collapse from post-partum hæmorrhage. At the same time lower the head, elevate the foot of the bed, cover with warm blankets, apply hot bottles to feet, legs, thighs and body, especially near heart, and hot cloths to head and neck, and give ether and digitalin or strychnine by hypodermic injection.

The next most important thing is the injection of normal saline solution to replace the fluid lost. Pass the tube of a fountain syringe well up into the rectum, or use a tube and funnel and inject slowly a pint of saline at 100° F., with one or two ounces of whiskey. This may be repeated in an hour. The enema thus carefully administered (or the saline simply "allowed to run slowly into the rectum") generally produces a good result in a short time. Many prefer the subcutaneous injection of the saline solution. This answers well and is generally done in the Burnside; but in private practise the enema is safer, easier to administer, and as a rule quite as efficient.

Give small quantities of liquids by the mouth every few minutes, as soon as the stomach will tolerate them, but be careful not to induce the patient to take enough to cause retching or vomiting.

Intravenous saline injection is favored by many surgeons and gynæcologists and some obstetricians. The dangers connected with the procedure are so many and so great that the average practitioner is scarcely justified in performing so serious an operation.

The so-called auto-transfusion—i. e., the application of a tight bandage to the four extremities—is not safe; but partial auto-transfusion—i. e., the bandage on leg and thigh on one side and forearm and arm of the other side—is probably quite safe and occasionally serviceable. The transfusion of blood from vein to vein, or from artery to artery, is both dangerous and ineffective, and therefore not worth considering.

SECONDARY POST-PARTUM HÆMORRHAGE

Causes.—Many causes and methods of treatment have been described, but I think there is only one cause and one line of treatment. The cause is the retention of a portion or portions of the secundines or an old clot, or clots.

This form of hæmorrhage, sometimes called remote or delayed puerperal hæmorrhage, is probably more common than is generally supposed. It frequently happens that profuse hæmorrhage commences quite suddenly after the ordinary lochial discharges have ceased for some time to be sanguineous.

In one patient under my care after an easy normal labor, the lochia after the fourth day grew lighter in color, being quite pale by seventh day, involution satisfactory. On tenth day, without any apparent cause, a sudden hæmorrhage commenced sufficiently copious to be rather alarming. I introduced the hand into the vagina and without much trouble passed two fingers into uterus and removed clots. Could feel no solid substance for a time, but after a careful exploration found a small mass which I scratched away with some difficulty. This was found to be a piece of placenta, free from offensive odor, about the size of a small bean. No hæmorrhage after this. Patient made a good recovery.

In another patient a serious hæmorrhage commenced on ninth day after labor. The fingers removed a good-sized piece of the membranes with a small piece of placenta attached to one corner. No further hæmorrhage. In neither of these cases was there any serious difficulty in introducing hand into vagina and two fingers into uterus without an anæsthetic. I prefer anæsthesia, however, in such cases.

In another patient, under the care of Dr. A., a rather severe hæmorrhage occurred on the tenth day after delivery. Patient kept very quiet, ergot, ergotine, sulphuric acid, quinine, etc., administered; slight improvement, but hæmorrhage never stopped altogether. On the twenty-fourth day after delivery a hæmorrhage, more severe than that of the tenth day, occurred. After a consultation a more vigorous line of treatment was adopted, the cervical canal was dilated and two small pieces of placenta were removed. No further hæmorrhage. In this case the fingers should have been introduced into the uterus on the tenth instead of the twenty-fourth day after delivery.

Dangers.—We may look upon the dangers arising from retension of uterine secundines and clots in three aspects:

1. *Immediate Danger from Hæmorrhage.* That this is very grave is proved by the fact that deaths from this kind of hæmorrhage occasionally occur as reported by McClintock Collins

and others. These sad results may be rare, but leaving such extreme cases out of the question it is impossible to estimate the injury which a woman during and after the puerperium may sustain from such hæmorrhage. It is the time when it is most important for her to conserve all her vital forces for the sake of herself, and also for her child who lives through her. Who can tell how often a hæmorrhage of this sort has been sufficient to turn the balance in a constitution which before that accident had been able to battle successfully against some serious disease such as tuberculosis, and give the body over to the dread enemy?

2. *More Remote and Secondary Dangers.* The masses of placenta or membranes retained may lead to the formation of fibrinous polypi, which produce congestions and inflammations of the endometrium with fungous granulations and thereby protract the bleeding indefinitely. Such is the history of many cases in which the patients become chronic invalids or fall into the hands of gynæcologists who, fortunately, are generally able to cure or greatly relieve.

3. *Danger from sapræmia and septicæmia* will be considered later.

Treatment.—As soon as possible after the commencement of the hæmorrhage one should explore the uterus and remove all offending matters. The methods of conducting this procedure will depend on the circumstances of each case; but, generally speaking, the best instrument for the purpose is the intelligent finger of the careful obstetrician. Up to the second week, and generally up to the *end* of the second week, it is usually not difficult to introduce one or two fingers into the cavity of the uterus. It is better, as a rule, to have an anæsthetic administered by an assistant. This saves the patient much suffering and enables the operator to do his work more thoroughly. During the third or fourth week the fingers may generally be pushed through the cervical canal by using a certain amount of force. If necessary use an artificial dilator, and a *dull curette with great care.*

The physician should not try to stop secondary hæmorrhages by the administration of medicines, such as ergot, quinine, strychnine, etc., before he has thoroughly explored and emptied the uterus. Always give medicines of this sort after local treatment has been carried out. They help to bring about the involution which is so much desired. Never give up an obstetrical case while

there is uterine hæmorrhage. It is the duty of the obstetrician to cure the patient instead of letting her drift into the hands of the gynæcologist. If, however, he is unable to cure the patient within a reasonable time he should call in consultation the best available gynæcologist.

CHAPTER XVI

ABORTION OR MISCARRIAGE

GENERAL CONSIDERATIONS

Use of Terms.—In the minds of the public abortion is confined to the induced operation—that is, the abortion brought about by artificial interference. Many women, both in towns and in the rural districts, are in the habit of inducing abortions by puncturing the egg with some sharp instrument, such as a knitting needle or hairpin. Many are unsuccessful in these attempts, while a certain number injure themselves very seriously. Death is sometimes the result of such criminal procedure. The induction of abortion by physicians is said to be quite common in certain cities and towns of this continent.

The term miscarriage, on the other hand, is applied to the emptying of the uterus from natural causes. Some limit the meaning of abortion to the discharge of the embryo during the first three months and miscarriage to the expulsion of the fœtus between the end of the third and the end of the seventh month.

The term abortion is generally recognized in the broader sense in medical literature—that is to say, abortion means the expulsion or delivery of the fœtus during the first seven months of pregnancy. One should be careful in speaking to his patients to use the word miscarriage rather than abortion. Some women feel quite offended if the physician hints at the possibility of their having had an abortion.

Occurrence.—Abortion occurs most frequently, so far as we know, in the third month. This is probably due to the fact that at that time the egg is to some extent loosened on account of the atrophy of a large portion of the chorionic villi. Next to the third month abortion happens most frequently in the second and fourth months. Some think that early abortion at five and six weeks, which is sometimes not recognized, may be as common as abortion in the third month. Such early abortion does undoubtedly occur

but probably not so frequently as supposed by some. Up to the end of the third month, or nearly so, the entire ovum is generally expelled. From the third to sixth month the membranes are first ruptured, then the fœtus is generally expelled, and finally the membranes and placenta may be disintegrated and come away gradually with danger of septicæmia.

Premature Labor.—Premature labor means termination of pregnancy between the end of seventh month and full term.

The fœtus is viable after the end of seventh month—but there are some exceptions to this. Abortion is practically equally common in primiparæ and multiparæ.

Causes.—The causes of abortion are as follows: syphilis; Bright's disease; malposition of the uterus, especially retroflexion; disease of decidua; abortion habit from unknown causes; diseases, such as exanthematous fevers, etc.; excessive vomiting; emotional violence; mechanical violence; death of fœtus; hæmorrhage; overfrequent coitus; excesses of mother, alcoholic, etc.; tumors of uterus; adhesions of uterus from old pelvic inflammations.

Varieties.—Varieties or degrees of abortion (Hirst):

1. Ovum when thrown off may be surrounded by the decidua, which is sometimes, or generally, much thickened. In the majority of cases probably the decidua vera is retained, and the decidua reflexa, or a portion of it, goes with ovum.

2. Simply the entire ovum without any decidua. When floated in water villi will be seen and the whole ovum looks like a chestnut burr.

3. Embryo with its amnion only.

4. Embryo expelled alone.

5. Embryo may die and be absorbed or cast off unnoticed, leaving behind a hollow fleshy mass, which may become a mole.

Symptoms.—The symptoms of abortion are: hæmorrhage, pain with uterine contractions, and complete or partial dilatation of the os uteri.

Hæmorrhage is altogether the most important symptom of abortion. We have two fairly well marked types of cases as regards the hæmorrhage:

1. When hæmorrhage, though not profuse, continues for a long time.

2. When hæmorrhage is copious almost or quite from the first.

Certain authors state that the hæmorrhage in early abortion is never so profuse as to be fatal. In the majority of cases hæmorrhage is not profuse even when it continues for a long time. Occasionally, however, the hæmorrhage is quite copious even at an early stage, and sometimes proves fatal in a short time.

The Aborting Habit.—In a large proportion of the cases the cause of the so-called aborting habit is unknown. In all such cases rest is an important element in treatment. It is not well, however, to keep a patient continuously in bed during pregnancy, because it is apt to injure her own health and also that of her unborn child, but it is well to keep her in bed during the week corresponding to the time of the ordinary menstrual period.

Garrigues reports one case in which nine abortions were finally followed by the birth of a child at term, and says that he has frequently prevented abortion by having the patient rest two days before menstruation should occur and continue in bed five days thereafter. During this week he gives dram doses of the extract of viburnum prunifolium three times a day. During the other three weeks he allows moderate exercise in the open air and gives tonics, such as iron, quinine, red bone marrow, and arsenic.

Coition, dancing, horseback riding, and all sorts of sports or fatiguing work should be forbidden. Sir J. Y. Simpson recommended the continuous administration of chlorate of potassium 15 to 20 grains three times a day for some months. I have not had much success with the chlorate of potash treatment, but some of my friends have great faith in it.

Prophylactic Treatment. For so-called *aborting habit.*

The patient must avoid excesses of all kinds, and remain in bed during the first three or four menstrual epochs.

If there is syphilitic taint or even a suspicion of it place patient under constitutional treatment. After an abortion has occurred give husband and wife constitutional treatment in order to avoid a repetition.

In case of retroversion or retroflexion correct displacement and if necessary introduce a suitable pessary and leave it until about the middle of the fourth month. A woman prone to abort should avoid coitus during the whole of pregnancy; also strong purgatives and vaginal douching.

THREATENED ABORTION

Rules for Treatment.—When hæmorrhage is not severe, the cervix is not dilated, and there is no evidence of the escape of liquor amnii, efforts may be made to prevent abortion.

Keep patient on her back in bed. Give an opiate, preferably by the bowel. Give with the opiate bromide and chloral, or give with the opiate viburnum prunifolium. Correct displacement of uterus if present. When hæmorrhage persists small doses of ergot may be given with the opiate. Keep patient in bed for one week after the hæmorrhage ceases. There is not much to add to these brief directions as to the treatment of threatened abortion. One should rely chiefly on rest and opiates, and with these one may use some form of viburnum prunifolium. How much good the latter does I am unable to say as I have never given it without the opiate, nor do I think I ever shall. The hæmorrhage may continue for a long time without cutting short the pregnancy. Some years ago I was much puzzled over the following case:

Mrs. K., aged thirty-two. Married nine years. Became pregnant for the first time. In third month hæmorrhage commenced and continued for eleven weeks, during which time she remained in bed. Was told by a physician she had a "false conception" but that the uterus was emptied and she was cured. I saw her at the end of seventh month for the first time. She was much alarmed on account of enlargement of her abdomen. Diagnosis very easily made, pregnancy with a vigorous fœtus. Healthy child delivered with forceps at full term.

False conception is rather an absurd term which has sometimes been applied to some form of fleshy mole due to the death of the ovum.

INEVITABLE ABORTION

Diagnosis.—When ovum protrudes through os. When liquor amnii has certainly escaped. When hæmorrhage is excessive. When the rather acute angle anteriorly between the neck and the body of the uterus has disappeared.

TREATMENT

Methods.—The treatment of inevitable abortion is different from that of threatened abortion, which we try to prevent. Our

desire in inevitable abortion is to have the uterus emptied completely and as soon as possible without using undue violence.

Directions as to treatment may be summarized as follows:

There are two methods of treatment generally recognized.

1. Expectant. Watching the patient carefully, keeping her quiet, and leaving her alone until interference is indicated on account of serious hæmorrhage or septic infection, with the hope that Nature through the uterine contractions will completely and safely empty the uterus.

2. Immediate active interference with the object of emptying the uterus as quickly as possible.

Methods of Active Interference.—The most common methods of active interference are: (*a*) Tamponade. Plugging the vagina or vagina and uterus (so far as possible as to the latter) with the object of stopping hæmorrhage, dilating the cervical canal, and causing reflex contractions and subsequent emptying of the uterine cavity. (*b*) Curettement. The most popular and efficient plan is to anæsthetize the patient, sterilize the parts, dilate the cervical canal, and empty the uterus with the finger or an ordinary metallic curette.

The intelligent and educated finger-tip is far better than any metallic curette and may be used in the "expectant" plan or after the tamponade or in rapid curettement. Sometimes a dull metallic curette or the flushing curette may be used when the finger can not be introduced into the uterus. Uterine or placental forceps are sometimes used.

After the finger has been introduced into the uterus the abortion should be completed as soon as possible.

It is frequently a difficult matter to come to a decision as to when we should cease to consider that an abortion is simply threatened, and decide that it is inevitable. Even after we reach our decision we may have some difficulty in deciding on a plan of treatment. Obstetricians vary greatly as to their opinion of treatment, and in a general way may be said to be divided into two camps—that is, those who believe in expectant treatment and those who believe in active interference; and yet a large number may be found who are not tied to either the one or other form of treatment.

The Expectant Plan of Treatment.—The term expectant is not a very fitting one, and is sometimes grossly misunderstood even by

physicians who ought to have a fair knowledge of obstetrical literature. A gynæcologist of this province about two years ago spoke as follows:

"In my early experience cases of abortion were treated on the so-called expectant plan, a wretched makeshift, and one that should never be entertained. This plan consists of daily visits by the doctor, who trusts entirely to Dame Nature without giving her any assistance. When fever sets in it is looked upon as a calamity that could not be avoided. The mother dies from what is called a bad miscarriage and a life is lost that could have been spared."

This description of the expectant plan is incorrect. No obstetrician of any note has advised any such method of treatment within the last forty years. According to the expectant plan the physician waits to see if Nature can complete her work; if not he promptly assists her to the best of his ability. It is generally understood among those who favor this method that active interference is absolutely necessary when hæmorrhage becomes serious, or when the slightest symptom of septic infection appears.

Lusk was perhaps the most prominent advocate of the expectant plan of treatment on this continent. He told us that when in the third month the ovum is thrown off without rupture of the fœtal membranes the hæmorrhage rarely assumes dangerous proportions, and explained how the uterine contractions sometimes press the ovum into the cervix, which dilates and in primiparæ becomes somewhat elongated. During uterine contractions the ovum descends and the upper portion of the body of the uterus retracts. Some coagulation of the blood takes place between the ovum and the retracted uterine walls, while the ovum forms a tampon which fills the cervix like a ball valve, and thus restrains the hæmorrhage. When there is no interference the egg, after being retained for a time as described, is frequently expelled entire, leaving the uterus in the best possible condition for satisfactory involution. In such cases, and they are by no means uncommon, Nature has done her work safely and efficiently. Lusk's views on treatment are in certain respects open to criticism. The following directions will probably meet the approval of most of those who advise the so-called expectant treatment:

When to Interfere.—Always interfere when the os and cervical canal are sufficiently dilated to allow the introduction of the finger into the uterine cavity. In attempting to remove the uterine

contents with the finger one should adopt the following definite plan of action and always presume, unless there is positive proof to the contrary, that the ovum is intact, and should not be broken:

Place the patient in the lithotomy position, preferably "across-bed," and with the external hand endeavor to depress the uterus through the abdominal wall until the index finger of the other hand can be passed through the os and up to the fundus. Anæsthesia is not necessary in the majority of cases, but is not infrequently either required or desirable. In the manipulations try to avoid rupturing the ovum. Pass the finger up on lateral wall of the uterus until it is above the egg, at or near the opening of one Fallopian tube, then pass it across the fundus to the neighborhood of the opening of the other Fallopian tube, and sweep down this wall, driving the contents of the uterus before it. If unable to remove the uterine contents by the finger in this way one should try the following Rotunda procedure: take the finger out of the uterus and place it under the fundus—i. e., in the anterior fornix if the uterus is normal in position, in the posterior fornix if the uterus is retroverted. Sink the other hand into the abdomen and compress the body between the two hands. The ovum is thus driven out of the uterus into the vagina and removed (Jellett).

It is well to remember in this connection that there is a period between early and late abortion, say in the latter part of the third month, when it is difficult with the finger-tip to make out the placenta, because it feels exactly like the endometrium. It is possible, under such circumstances, to make the mistake of imagining that the uterus is empty while the thin broad placenta is completely adherent. In such a case it is better to try to remove this placenta by scraping with the finger-tip. In case of failure it is better to use the flushing or ordinary dull curette.

When immediate active interference is considered necessary tamponade or curettement should be done.

Treatment by Tamponade.—Treatment by tamponade is in the opinion of many the safest and best form in all varieties of inevitable abortion, whether complete or incomplete, excepting in certain cases of septic infection where it is advisable to empty the uterus as quickly as possible with the finger or some form of curette.

There are two forms of tamponade: 1, vaginal tamponade; 2, utero-vaginal tamponade.

Vaginal Tamponade.—A vaginal tampon in order to be effective should be properly introduced, but I fear that in a majority of instances the vaginal tamponade is not properly done. In the first place the material used should be made antiseptic, because a simple sterile tampon in the vagina very soon becomes foul. We may accept the conclusions of Krönig and Williams that there are no pathogenic cocci in the vaginal secretions of a healthy woman during pregnancy. There are, however, bacteria, which, although harmless as a rule, are not always innocuous, because under certain circumstances they cause putrefaction.

Schauta's Method.—Take a strip of iodoform gauze about two yards long and three to four finger-breadths wide, and firmly pack the entire vault of the vagina, allowing the end to hang out of the vulva. Schauta thought that two fingers of the other hand form a better guide in tamponing than a speculum. If sacral pains occur, indicating that the embryo has been expelled, the tampon may be pulled out; if such pains do not occur the tampon should be removed in twenty-four hours. If the abortion is not complete and bleeding still exists, it should be replaced, especially if the os is more dilated than the day before. Tamponing may be safely kept up many days if the tampon is renewed every twenty-four hours. In this way, as a rule, the intact ovum is obtained, whereas by some energetic efforts it is crushed. If, however, under the tamponing the os is dilated so as to admit two fingers and the ovum does not come away, one should interfere actively. If bleeding still continues, the utero-vaginal tamponade, as hereafter described, may be tried.

Utero-Vaginal Tamponade.—In using a tampon we expect the following results: (1) It stops hæmorrhage. (2) It assists further separation of the ovum by damming up the blood. (3) It excites uterine contraction and retraction. (4) It dilates the cervical canal.

Dührssen believes that these results can be obtained with greater certainty and safety by plugging the utero-vaginal canal than by tamponade of the vagina only. In late abortions the results are especially good, better in all respects and in all cases than by curettement alone.

The method consists of stuffing as much iodoform gauze as possible into the uterine cavity and then thoroughly plugging the vagina.

I should recommend this kind of tamponade in all cases where it can be done. Frequently it is not possible at first, but when one removes a vaginal plug after twenty-four hours, it is almost always easy when introducing a second plug to pass some of the gauze into the uterus, or, in other words, after a vaginal plug has been in place twenty-four hours it is easy after its removal to do a utero-vaginal tamponade instead of a simple vaginal tamponade. There are many differences of opinion as to detail with reference to tamponade, as the following paragraphs will show:

A Dublin physician tells us the dangers of plugging the vagina, unless the plugging is aseptically performed, are considerable, and even if the plug itself is aseptic, blood may stagnate above it, and putrefy. The decomposition then extends to the uterus, and though the patient seldom dies, as a result she is frequently left an invalid for years from tubal disease and pelvic peritonitis.

An Edinburgh physician tells us that in plugging we should use strips of antiseptic gauze, or of any soft textile material rendered aseptic by boiling or immersion in an antiseptic solution.

A London physician tells us to douche the vagina with bichloride of mercury 1-2000 before tamponade, and to soak the material used in a similar solution before introducing it. Nearly all the obstetricians of Great Britain tell us that a tampon should not be left in the vagina longer than eight, ten, or twelve hours.

A Toronto physician tells us that iodoform gauze should not be left in the uterus, because it is apt to poison the patient. Many of the American authors advise us to use iodoform gauze and to leave it in from twenty-four to forty-eight hours, but very few of them speak clearly as to utero-vaginal tamponade. Garrigues uses iodoform gauze to some extent, but he considers it too porous to form a reliable antihæmorrhagic plug. He only uses it when there is a partial dilatation of the cervical canal, then he fills this with iodoform gauze and considers that it is well adapted for the purpose, on account of its softness. He also, in some cases, placed a pledget of iodoform gauze at the vault of the vagina covering the os. This objection to iodoform gauze is worthy of consideration. Sometimes gauze is used which is very coarse in texture and poor in quality. I think it exceedingly hard to make a dense plug with such material. I think, however, good iodoform gauze generally makes an efficient plug, as the amount of serum-

like fluid which passes through such a plug is not likely to be very harmful.

Rules.—With reference to the various points raised, the following rules may assist the accoucheur in practise:

Asepsis without antisepsis is not safe in vaginal or vagino-uterine tamponade.

"Any soft textile material rendered aseptic by boiling" is not safe for such tamponade.

A solution of bichloride of mercury is not suitable for douching before tamponade nor for medicating the tampon, because it tends to unduly harden the tissues.

The best material for tamponade is iodoform gauze or cotton. Sterile cotton soaked in a 1 per cent. solution of lysol also answers well.

A tampon of iodoform gauze may with safety be left in the vagino-uterine canal one or two days. Iodoform is slightly poisonous, but the danger of serious poisoning when used as indicated is not worth considering. Some gynæcologists leave iodoform gauze in the peritoneal cavity a week without evil consequences. A simple aseptic tampon should not be left in the vagina longer than eight to twelve hours.

Curettement.—In the hands of an expert this is a comparatively safe and very effective method of quickly emptying the uterine cavity. It is, however, a difficult operation to perform (much more so than the amputation of a leg), and also involves a considerable amount of danger, especially in unskilled hands. If for some reason it is considered very important to empty the uterus quickly, rapid curettement under anæsthesia is practically a necessity. This is especially true in some cases of septic abortion. After such curettement the introduction of iodoform gauze into the uterine cavity is always advisable.

I shall briefly refer to some aspects of abortion from a clinical standpoint.

One is called to see Mrs. A., aged twenty-five, in third month of pregnancy. She has had some uterine hæmorrhage for twenty-four hours, with some pain. What is the diagnosis? She has symptoms of abortion. What is the proper treatment? Before deciding on any line of treatment the following question should be considered: Can abortion be prevented? Let us suppose, in the first place, that the hæmorrhage is not serious, and on examination

that the os is not patent. The physician thinks or hopes that abortion is preventable, and will make an effort to prevent it. He will keep the patient in bed, give her opiates—say, a suppository of 1 to 2 grains of opium every four to eight hours—and at the same time see that the bowels are kept open by some saline aperient. He will also give some preparation of viburnum prunifolium, or bromide, or chloral by the mouth. If the pains and hæmorrhage cease, he may consider that the treatment is successful. The patient who has suffered but little and lost but little blood will probably be anxious to get up. How long should she remain in bed? Not less than seven to ten days after hæmorrhage ceases.

In another case there is serious hæmorrhage and perhaps the os is patulous. The hæmorrhage is here the important symptom and must be checked. The physician decides that the uterus must be emptied—that is, that abortion is inevitable. If the finger can enter the uterus he will clear out the contents at once. Anæsthesia may be necessary. One may be able, with the finger, to clear out most of the contents of the uterus, but may not be able to quite reach the fundus. He has removed most of the uterine contents, but fears that something is retained near the fundus. In such a case he should introduce a vagino-uterine tampon or use a curette.

If the cervical canal is not sufficiently dilated to allow the introduction of the finger, it is well to introduce a tampon of iodoform gauze into the vagina. In early abortion one may hope to stop the hæmorrhage, cause uterine contractions, and dilate the cervix. On removing the tampon the following day the operator may find the egg entire in the vault of the vagina. If so, the abortion is now complete and the patient is practically well.

If, on the other hand, after removing the tampon he finds neither the egg nor any portion of it in the vagina, he should ascertain the condition of the cervical canal. If it is dilated sufficiently to admit the finger he should endeavor to clear out the contents. If unable to do this, he should try tamponade of both uterus and vagina. He should remove the tampon again in twenty-four hours. By this time he will probably find the uterus empty, or the condition such that he can readily empty it. If still in doubt as to whether the uterus is empty, he should curette, using first, finger-tip; second, metallic dull curette if necessary.

While many object to the use of the metallic curette, except

as a last resort, some of our best obstetricians use it quite commonly. Even in conservative Rotunda curettement is done in nearly 50 per cent. of the cases of abortion. At a certain medical society meeting two years ago, in reply to some adverse criticism as to such frequent curettement, Jellett stated that although he could not say the curetting had led to any bad results, he thought they would do wrong if they sent out men with the idea that 50 per cent. of abortions required curetting.

Fig. 131.—Mass of Placenta retained in Uterus Fourteen Months. (Algernon Temple, Tor. Univ. Museum.)

After-Treatment of Abortion.—Keep patient in bed not less than a week after the completion of the abortion, and longer if the lochial discharges remain copious. Some think that the uterus after abortion is not well prepared for involution. A slight lochial discharge usually persists for about three times as many days as the gestation has lasted months.

Missed Abortion.—When ovum dies but is not expelled, it may be retained in the uterus without giving rise to serious symptoms for weeks, months, or possibly for more than a year.

The subject of missed abortion is an extremely interesting one from various points of view. We now know that a dead ovum may be retained in the uterus without any change in structure for months and possibly years. Formerly the limit was supposed to be nine months. It has, however, been proved that the limit may be much longer.

In the case of Kitson *vs.* Playfair a uterus was emptied in February, 1894. Dr. Playfair contended that the substance removed was a comparatively fresh piece of placenta remaining in the uterus after a recent incomplete abortion. On the other hand, it was contended by able and competent obstetricians that the substance removed might have been the result of a conception at least eighteen months before, and was part of a blighted ovum which perished in October, 1892, which had been retained in the uterus for sixteen months.

In a certain proportion of cases the fœtus may die without any serious symptoms until nine months after conception, when labor comes on and the uterus is emptied without artificial assistance. The following is an example:

A patient of Dr. Walters, East York, had some pains and a slight hæmorrhagic discharge in fifth month of pregnancy. After a few days' rest in bed the pains and hæmorrhage stopped completely. She had no further symptoms and no abdominal enlargement for months after. The patient was watched with a certain amount of anxiety but appeared to be in her usual health. At full time labor pains came on spontaneously and a five months' dead fœtus was expelled.

There is considerable difference of opinion as to what should be done under such circumstances. Some think that the patient should be left alone in the absence of disturbing symptoms; others think that it is always desirable to empty the uterus when the death of the fœtus has been diagnosed with certainty.

I do not know why, in certain cases, labor pains come on at full time, while in other cases the blighted ovum is retained for one or two years, but think that the blighted ovum of early pregnancy is more apt to be retained for an indefinite time, while that of later pregnancy is apt to be expelled at or about full time.

Treatment. I think that it is better not to interfere, as a rule, when there are no serious symptoms, especially as in a large proportion of cases there is a certain element of doubt as to diagnosis. We find in practice that it is no easy matter in all cases to make a diagnosis of death of the fœtus. There can be no difference of opinion, however, as to the fact that when serious symptoms arise one should always empty the uterus as soon as possible.

In my references to the treatment of abortion I have always had in view those cases which occur in the first half of pregnancy.

From the fifth month one should conduct the abortion as in labor at full time.

OTHER VARIETIES OF ABORTION

There are some other technical terms applied to different varieties of abortion to which brief reference may be made. It should be remembered in the same connection (as before mentioned) that in abortion the separation generally takes place in the spongy or middle layer of the decidua, but occasionally in the compact or superficial layer.

Complete Abortion.—All within the spongy layer comes away —i. e., the membranes (including part of decidua vera and decidua serotina, decidua reflexa, chorion, and amnion), placenta, and embryo or fœtus.

Incomplete Abortion.—Some one or more of these structures are retained in the uterus. In considering the treatment of incomplete abortion the following division of abortion is of some importance:

Early abortion—before tenth week.

Late abortion—after the tenth week.

Active interference is desirable as a rule, because after the ovum sac is burst septic infection is apt to occur. Curettement is suitable in some cases of early incomplete abortion. Utero-vaginal tamponade is better in late incomplete abortion.

Neglected Abortion.—When a patient has hæmorrhage and other symptoms of abortion for some days or weeks without any treatment, perhaps without ever consulting a physician.

Treatment. Active interference is desirable, as this is an incomplete abortion with great probability of septic infection.

Cervical Abortion.—This term is applied by some to a condition in which the ovum is expelled into the cervix. In multiparæ the ovum is generally soon expelled, but in primiparæ it may remain for days on account of slow dilatation of external os.

Treatment. Dilate external os with finger, cervical tamponade, or a steel divulsor. Lateral incisions of the os are recommended by some in stubborn stricture.

Deciduoma Malignum or Chorio-Epithelioma.—*Deciduoma malignum* was the name given by Sänger in 1888 to a very malignant tumor of the uterus which he supposed to be a sarcoma of the decidua serotina. Many surgeons refused to accept the opinion

that this tumor was a distinct pathological entity, and expressed the view that it was simply an ordinary sarcoma developed at the placental site. There was much confusion and difference of opinion on the subject for years, but Marchand threw much light on the matter in a first publication in 1895, and a second in 1898.

According to Marchand's views which are now generally accepted, the growth is extremely malignant, but not a sarcoma. It is an epithelioma developed from the epithelial layers covering the chorionic villi. To speak more precisely, it arises from the Langhan's layer and the syncytial layer, both of which are of epiblastic origin.

McMurtry points out clearly that clinically the disease presents a distinct history. Hæmorrhage is the first and most persistent symptom, and is not controlled by curettage. The flow is at first red, but soon becomes dark and offensive. Pain is frequently present. The uterus is enlarged and soft, with the os patulous. There is generally early metastasis. The metastatic deposits consist of the same elements as the primary tumor, but grow more rapidly. They are found most commonly in the lungs and vagina. Death generally occurs within a few months after the initial hæmorrhage. It frequently follows hydatid-mole pregnancy, but in a certain proportion of cases (not now known) follows ordinary abortion, full-time labor, and ectopic pregnancy.

In September, 1900, I saw a patient supposed to be nine or ten weeks advanced in pregnancy. The chief symptom was slight hæmorrhage, and the uterus was enlarged and retroflexed. On account of my illness, which commenced in October, I did not see her again. She was treated by Dr. Herbert Hamilton. A few months later hysterectomy was performed by Drs. Hamilton and Temple, but she died shortly after from the metastatic growths. Careful examination of the primary growth by Dr. G. C. Wagner showed that it was deciduoma malignum.

It is now generally believed that the term deciduoma malignum is really a misnomer, and that the name suggested by Marchand—chorio-epithelioma—which is commonly used now on the Continent of Europe, is more suitable. The term deciduoma malignum, however, is more commonly used in England, the United States, and Canada.

Treatment. Early and complete hysterectomy should be performed.

CHAPTER XVII

PROLONGED AND PRECIPITATE LABOR

PROLONGED LABOR

When the obstetrician visits St. George's Chapel, Windsor Castle, let him not forget to view the cenotaph of the Princess Charlotte. This monument, built in memory of one of England's most dearly beloved women, serves also as a memorial of the saddest obstetrical calamity recorded in British history. All England, in 1817, was waiting for a happy termination of the Princess Charlotte's pregnancy. The membranes were ruptured on Monday at 7 P. M. Labor pains followed soon after and continued in varying degrees for fifty hours. There is every reason to suppose that in this "dry" labor the uterine contractions were accompanied by more than the average amount of suffering. The first stage probably lasted about ten to twelve hours; the second stage, thirty-eight to forty hours. The three distinguished physicians in charge decided that "giving assistance was quite out of the question," as the "labor proceeded regularly although slowly. The child was born without artificial assistance." Soon after delivery there was post-partum hæmorrhage and hour-glass contraction, and the placenta was removed by the hand introduced into the uterus. In two hours she became "sick at the stomach, had noises in her ears, became talkative, and had a frequent pulse." In another hour symptoms of pulmonary thrombosis occurred. Patient died in a few minutes. It is somewhat difficult to realize that this tragedy was enacted in England, the land where the midwifery forceps were invented.

In discussing the subject of protracted labor, I shall in the first place refer only to those cases in which there is no mechanical obstacle to delivery, and the delay in the expulsion of the child is due to certain abnormalities of the uterine contractions. A labor has been unduly prolonged when it has lasted twenty-four

hours or longer. The most serious protracted labors are those in which the second stage lasts longer than four hours. The dangers to both mother and child increase in almost geometrical progression (doubled each hour) as the hours roll on beyond this limit.

Uterine Inertia.—When the pains are weak we have inertia of the uterus. Herman insists on the importance of recognizing two varieties:

1. Primary uterine inertia, or weak uterine action. When the pains early in labor are weak or few. Under ordinary circumstances the pains become more frequent and stronger.

2. Secondary uterine inertia, temporary passiveness, or uterine exhaustion. When the pains early in labor are frequent and strong but not effective, in consequence of which the uterus gets tired and the pains get less frequent and less strong, and at length may cease altogether.

Tetanic Contraction of the Uterus.—Braxton Hicks first clearly demonstrated that in protracted labor, and especially in obstructed labor, the intervals between the pains frequently get shorter until at last there is no interval at all, and the uterus is continuously contracted—i. e., there is tonic or tetanic contraction of the uterus.

Differences.—Herman also insists on the importance of making a diagnosis between secondary inertia and tonic contraction of the uterus. He gives the points of difference somewhat as follows: In secondary uterine inertia the expression is placid, pulse not over 100, the breathing not hurried; the uterus is not tender; the child can be moved about; the presenting part can be pushed up easily; there is little or no swelling of vagina and vulva.

In tonic contraction of the uterus, the expression of face is tired and anxious, pulse is small and quick—120 or over—breathing hurried; the uterus is tender and hard; child can not be moved about; the presenting part can not be pushed up; there is swelling of vagina and vulva if the head is in the pelvic cavity.

These differential signs of the two conditions are correct and important, but it is well to bear in mind that weak uterine contractions accompanied with little or no pain, if continued long enough, are generally, if not always, followed by tetanic contraction of the uterus accompanied by intense suffering. A certain amount of confusion is apt to arise through our unscientific method of substituting the word pains for uterine contractions, although

for clinical purposes it is often convenient to do so. Further references are made to abnormal contractions in connection with "dry" labor.

CAUSES OF PROLONGED LABOR

The *causes* of prolonged labor are: weak constitution, general exhaustion from debilitating diseases, hot climate, a luxurious life, indulgence, etc., frequent child-bearing, undue distention of the uterus from excess of liquor amnii, loaded rectum, distended bladder, mental conditions, such as depression, fright, etc., age (labor often tedious in elderly primiparæ), undue obliquity of the uterus, early rupture of membranes.

In many cases we do not know the causes. It is remarkable that an ordinarily healthy woman may in one instance have a rapid labor and in a couple of years after have a tedious labor without any known cause. While it is unnecessary to pay much attention to such causes as weak constitution, hot climate, frequent child-bearing, etc., one should keep in mind others of the above-named causes.

Hydramnios.—Undue distention of the uterus from excess of liquor amnii does undoubtedly tend to prevent strong uterine contractions. Even after the membranes are ruptured the head of the child may act as a ball valve and cause retention of the greater part of the "waters" until the head is slightly pushed up by the fingers, or pushed on one side by a single blade of the forceps.

Adhesion of Membranes.—Unusually firm adhesions of the membranes to the uterine wall may prevent the "bag of waters" from bulging into the os and stretching it. A slight detachment produced by passing the finger within the os and sweeping it round will frequently induce stronger pains.

Loaded Rectum.—Fulness of the rectum may cause weakness of pains early in labor. If, however, the physician carries out the directions as to the administration of an enema in all cases of labor, he will guard against this.

Distended Bladder.—Fulness of the bladder may cause weakness of the pains in two ways: (1) by causing the "bearing down" efforts to be painful; (2) by partial obstruction when in a case of cystocele the full bladder is found in the pelvis in front of the presenting part of the child.

Emotion, as, for instance, when the entrance of the physician into the room "frightens away the pains," is a well-known cause of temporary weakness of pains.

Age in certain cases tends to cause prolonged labor, especially in elderly primiparæ. It is supposed by many that the pains are apt to be irregular in the very young and thus prolong the labor. This is not in accord with our experience in the Burnside, where several girls, at ages from thirteen to fifteen, have been delivered, and as a rule have shown no abnormality in this regard.

Deviation of the Uterine Axis.—Excessive lateral obliquity is occasionally a cause of prolonged labor. Anteversion with more or less flexion is probably a more frequent cause. On account of undue laxity of the abdominal walls the fundus may hang forward in such a way that the presenting part is directed backward toward the sacrum instead of toward the pelvis.

DRY LABOR

Dry labor occurs when membranes are ruptured before labor or early in labor. The so-called dry labor is in a large proportion of cases a protracted labor, nearly always accompanied by serious symptoms and frequently followed by disastrous results, as in the case of the Princess Charlotte.

Definition of Term.—The term "dry," as applied to such labors, is unscientific and to a certain extent misleading. A dry labor is one in which the membranes are ruptured and the waters evacuated before the onset of labor, during early uterine contractions or during the first stage of cervical dilatation. In other words, the term "dry" simply refers to premature rupture of the membranes and discharge of the liquor amnii. If any portion of the parturient canal (especially the mucous membrane of the vagina) becomes hot and dry, that condition should be considered as one of the complications, and not as an essential feature of the "dry" labor.

Dangers.—The dangers to the mother and child may be enumerated as follows:

The dangers to the mother are: Exhaustion from long-continued pains with tetanic contraction of the uterus, rupture of the uterus, laceration of the cervix, vagina, pelvic floor, and perinæum, various forms of fistulæ, post-partum hæmorrhage, pulmonary thrombosis, septicæmia. The dangers to the child are chiefly asphyxiation and meningeal hæmorrhage.

Physiology.—In connection with the physiology of labor reference was made to the mechanism of uterine expulsion. While as a rule every muscle in the body has an opponent the muscular fibers of the uterus have as their opponent the liquor amnii contained within the membranes, acting by hydrostatic pressure.

Premature rupture of the membranes destroys the proper equilibrium of the various forces in a way not easily understood. Generally something like a storm arises, accompanied with irregular contractions, and perhaps tetanic contraction of the uterine walls, spasms of the cervix, and pains, sometimes intolerably severe, with diminished expulsive force.

These great changes in the expulsive forces have much more to do with the difficulties connected with the progress of the labor than the shape of the hard presenting part as compared with a bag of water.

History of a case which occurred many years ago:

Primipara. Full term. Membranes ruptured Thursday morning. Labor pains commenced the following Sunday morning. The contractions soon became irregular and were accompanied by intense pain, amounting to agony at times. Occiput posterior. Administered chloroform. Introduced hand and rotated occiput to the front. Applied forceps, delivered with difficulty. Was mortified to find that the occiput had slipped to the rear while I was applying the blades of the forceps, and there was a bad rupture of the perinæum and pelvic floor.

The treatment of this case was, in many respects, anything but good. The labor occurred at a time when I had rather hazy ideas as to the proper treatment of dry labors. In the first place, I did not take sufficient care of the patient during the two days intervening between the rupture of the membranes and the onset of labor. Next, I administered chloroform myself, chiefly from a desire to save my patient the payment of an extra fee. Next, I gave chloroform badly. Finally, my treatment of the occipito-posterior position was faulty.

There was no nurse present, the people were poor, and I tried to do the best I could without assistance. In recent years I have not attempted anything of this sort. I want an assistant who will give all his attention to the administration of the anæsthetic. Fortunately, in this case the mother and child both did well, and

I was able to repair the injuries to the pelvic floor and perinæum by immediate operation.

I now pass on to speak of later work, giving especially the results of my observation during the last five years. Before doing so, however, I shall return to the case of the Princess Charlotte and express certain opinions from a clinical standpoint.

After the rupture of the membranes at seven o'clock there was a pause, followed shortly by pains, which during the latter part of the night were very severe. The cervix was probably dilated at about seven o'clock Tuesday morning. Patient was then almost exhausted. She urgently required assistance, and should have been delivered about eight or nine o'clock, or by eleven o'clock at the latest. Pains were less severe during Tuesday, but became strong again about midnight. Delivery was expected every hour during the first half of Wednesday. Child died, probably during this (Wednesday) morning. Uterine contraction strong, with great suffering Wednesday afternoon and evening. Child born at nine o'clock.

The chief cause of the delay after Tuesday morning was probably faulty position of the head, the occiput being posterior. After delivery the patient suffered terribly from exhaustion and shock. There was hour-glass contraction and considerable hæmorrhage. There was probably serious injury to the pelvic floor, laceration of the cervix, and a certain amount of necrosis of the tissues, subjected to the prolonged pressure, which would have resulted in a fistula, or two or three fistulæ, had the patient lived.

General Statements.—Before going into details the following general statements may be made:

A small proportion of dry labor cases progress favorably even when membranes have ruptured two to seven days before the onset of labor.

Generally the labors are tedious and painful far beyond the average.

The tremendous storms which sometimes suddenly and unexpectedly arise in connection with the uterine contractions are occasionally accompanied by pains amounting to agony, which is unendurable for any length of time.

In many cases where the patients' lives are saved much injury is done through hæmorrhages or injuries to the parturient canal.

By judicious treatment the lives of mothers and children can generally be saved, and the sufferings of the mother can be greatly diminished.

In a large majority of cases the occiput is turned to the rear, and remains so unless the malposition is rectified artificially.

In a small proportion of cases of these occipito-posterior positions the occiput goes to the front naturally.

In a certain proportion of dry labors there is some pelvic deformity, generally contraction of the brim.

I shall now refer to a few cases illustrating some of these points.

Malposition of Head.—I had noticed years ago that among the many varieties and complications of tedious dry labor, malposition of the head was somewhat common. I have recently, however, reached a definite conclusion that in the majority of cases of pronounced dry labor—that is, when the membranes have ruptured before the onset of labor (especially some time before)—the occiput points to the rear. Whether this faulty head position is the cause or effect of the evacuation of the liquor amnii, I do not know.

In the early part of 1899 I happened to have three difficult dry labors within a short time, two of them being the worst I ever saw. In each the occiput was posterior. I then went over some of my notes, and found that such complication was more common than I had thought. I have studied the matter somewhat carefully since and shall give some statistics later.

Danger from Pain.—The following report illustrates the great danger which sometimes arises from the extreme pain:

Primipara. An educated, refined, and somewhat delicate and small woman, graduate of the Toronto General Hospital Training School for Nurses, married to a physician living in Ontario. Came to Toronto for her accouchement, and was staying at the house of a friend before coming into a private ward at the Burnside. The membranes ruptured one morning, without warning, and she at once went to the hospital. Walked about a great deal during the day with the hope of bringing on labor pains. The following day she did more walking until she became weary, and yet no pains appeared. About eight in the evening she was lying on a couch, but got up somewhat hurriedly and went into the next room to look for something she wanted. She was then seized with severe pains. Dr. Smith, the resident interne, and Miss McKellar were up-stairs looking after a patient suffering from post-partum hæmorrhage, and did not get down-stairs to our patient for about half an hour. I was sent for, but

did not reach the hospital until nearly ten o'clock. I found the patient exhausted, and suffering so terribly that I feared she would go into convulsions, notwithstanding the fact that some chloroform had been administered. I have since been told by Miss McKellar that she never before nor since saw a patient suffer such agony for an hour. I ordered chloroform to be administered to the surgical degree as rapidly as possible, while I was preparing. I introduced first fingers, then whole hand, rotated so as to bring occiput to the front, applied the forceps and delivered, operation being completed at eleven o'clock. The patient made a good recovery.

It may be noticed in connection with this report that great efforts were made by Miss McKellar, Dr. Smith, and to some extent myself, to get the woman to exert herself as much as possible with the hope of hurrying the onset of labor pains. I have lately come to the conclusion that such efforts are decidedly injurious. I think that the patient should keep as quiet as possible and generally in bed. I should not say that it is always necessary for a woman to remain constantly in bed, especially when the membranes rupture many days before labor commences; but I think that she should keep as quiet as possible and not do anything which is likely to make her tired. I think that, in this instance, the terrible nerve storm which attacked this delicate little woman was to some extent due to the fact that she was partially worn out before the contractions commenced.

Kennedy McIlwraith's case. Primipara. Membranes ruptured a week before labor. After onset of labor pains went on fairly well. Child expelled normally with occiput to the front. The labor would have been quite uneventful except for the accident of a somewhat bad rupture of the perinæum, which was restored by immediate operation. I mention this case simply to show that what one might call an extreme form of dry labor may occur without any serious complication.

Primipara at Burnside. Labor forty hours. Liquor amnii discharged thirty hours before delivery. Occiput posterior. Under an anæsthetic, hand introduced into the vagina and unsuccessful efforts made to bring the occiput to the front. Applied the forceps, delivered, occiput remaining posterior. I may say that I think the patient in this case was not well managed, and would not be treated in the same way to-day. She should have been delivered ten hours earlier, instead of waiting until the soft parts were fully dilated and the head jammed down in such a way that rotation was impossible. Chloroform should have been administered sooner, the parts should have been dilated artificially, malposition corrected, and the child delivered by forceps.

Positions.—Before speaking of treatment I wish to refer to a few points in connection with my last twenty-one cases of dry labor. In eleven there were difficult occipito-posterior positions; in five there were occipito-posterior positions with natural rotation of occiput to the front; in five there were occipito-anterior positions. I am not certain as to the exact truth in the last two sets of cases—that is, the cases of occipito-posterior positions which rotated naturally to the front, and the ordinary occipito-anterior cases. There must generally, or frequently at least, be some doubt whether an occipito-anterior position was not originally an occipito-posterior. By external examination we can nearly always discover at once whether the occiput points to the left or right, but we can not always decide with certainty as to whether it points to the front or the rear. By internal examination we can not get any information on this point in a fairly large proportion of cases early in labor, because we can not reach the presenting head.

In difficult occipito-posterior cases the occiput was rotated to the front manually in seven cases and kept in such position until the forceps were applied. The occiput was manually rotated to the front, but slipped to the rear again while the forceps were being applied, in two cases. The occiput could not be rotated to the front without too much violence in two cases.

TREATMENT IN DRY LABOR

Before giving definite rules as to treatment, I shall make a few clinical remarks regarding the following two cases:

A. B. I para. Membranes ruptured at 9.30 A. M. Seen by me 10.45 A. M. Patient had had no pains. By external examination the back of the child easily discovered on mother's right, and slightly posterior. Within a few minutes I was able to make the following diagnosis: Dry labor, head presenting in second or third position. By internal examination I could make out absolutely nothing as to presentation.

I have made my diagnosis, in part at least. What is my prognosis? The condition is serious; I think of the various dangers to which I have alluded, and desire to avoid them. I have no idea that I can make the labor easy, but I feel that I can guard against most of the dangers, if not all. I order rest and quiet as much as possible. The patient tells me she would like to get up "to look after a few little things." I agree at once, largely because I do not wish to lay down iron rules which might cause

some exaggerated views as to danger, and thus cause alarm in the patient. At the same time I tell husband and nurse I want none, or as little as possible, of that "moving about" which is so dear to some midwives and accoucheurs. She gets up, puts on a wrapper, looks after her "few little things" and returns to her bed. An enema is then administered. When slight pains commence at 1 P. M. three doses of chloral are given at intervals of twenty minutes, and appear to afford some relief. At 3 P. M. some dilatation of the os, occiput to the right posterior. At 5 P. M. a little chloroform during pains, occiput apparently coming to the front, uterine contractions accompanied by severe pains. At 6 P. M. chloroform almost to surgical degree; occiput found to be anterior, os fairly well dilated. Chloroform to obstetrical degree another hour. At 7 P. M. chloroform to surgical degree, forceps applied, easy delivery. Placenta separated in about fifteen minutes, expressed in twenty minutes. Uneventful recovery.

In this case it appeared to me that the rest, the chloral, and the chloroform all did good. In addition, I think the strong regular uterine contractions between 3 and 6 o'clock were sufficient to cause normal flexion, and, as a consequence, anterior rotation of the occiput. Probably expulsion would soon have occurred without the application of the forceps, but we thought the patient had suffered enough.

Strong and regular pains may come on even a week after rupture of membranes, as in the case of McIlwraith already mentioned, and cause anterior rotation of the occiput and normal expulsion.

C. D. III para. Pains commenced at midnight, membranes probably ruptured in about half an hour. Saw patient first at 1.45 A. M. Nurse gave her a hot bath and enema. The patient was then kept quiet in bed.

Contractions became fairly strong about three o'clock, but were irregular and accompanied by much suffering. At 3.30 and 3.45 chloral given in fifteen grain doses. After 4, pains were exceedingly severe, with very short intermissions. The chloral had done absolutely no good. What should one do now? Would it be well to keep the patient again in a hot bath and then give her a hot douche, for instance, a solution of lysol, for some fifteen or twenty minutes? No. Under such circumstances the hot bath and the hot douche are absolutely worthless; the storm is coming on and will soon be in full force unless one acts promptly and vigorously. At 5.30 chloroform given to the surgical degree by Dr. Hutchinson. Chloroform had a marked influence on cervix, vagina and perinæum. Parts were dilated by hand. In a few minutes forceps applied; easy delivery. Mother and child both did well.

Definite Directions as to Treatment.—Put the patient in a hot bath and administer an enema. These procedures should be carried out as a matter of routine in all cases of labor. Keep the patient quiet in bed. Give chloral in all cases of dry labor as soon as the pains commence. In those cases where the membranes rupture days before the onset of labor it may be well to give two or three doses of chloral about bedtime. As directed years ago by Playfair, give fifteen grains every fifteen or twenty minutes for three doses.

Give chloroform to the obstetrical degree when the pains become very severe. It is not easy to give any definite rule as to how much chloroform should be administered in such cases. We must always bear in mind the fact that the administration of large quantities of chloroform may be followed by very serious results, especially by post-partum hæmorrhage. Having this in view we ought to be exceedingly careful about the administration of chloroform early in the first stage, or perhaps at any time in the first stage.

If a patient when first seen has been in dry labor for many hours and is considerably exhausted, and there is at the same time spasm of the cervix or Bandl's ring, or of the whole body of the uterus, chloroform may be administered as follows: Administer chloroform to the surgical degree perhaps for twenty minutes. The patient may shortly afterward waken, feel much refreshed, and the spasm may be greatly or wholly relieved. In other cases it may be well to give chloroform for a short time, followed by hypodermic injection of morphine, allowing the patient to have a comfortable sleep, after which the condition will be found to be greatly improved.

Make it a rule always to terminate labor as soon as possible, under such circumstances, even when there is considerable rigidity of the perinæum, vagina, and cervix. As before mentioned, the administration of chloroform nearly always makes a vast difference, the parts become, if not dilated, much more dilatable than they were.

It is generally desirable to rotate the occiput to the front, but the treatment of occipito-posterior cases is discussed in detail in another section.

The Use of Oxytocic Drugs.—*Ergot,* as before mentioned, is always likely to do harm, and is especially dangerous in cases of prolonged labor, whether "dry" or otherwise.

Quinine is worthy of consideration. When given in a full dose of ten grains it occasionally has a good effect.

Strychnine is valuable in certain cases of uterine inertia accompanied with general constitutional weakness.

DIFFICULT OCCIPITO-POSTERIOR POSITIONS

Confusion of Opinions.—Nothing in connection with obstetrics is more confusing than the literature respecting occipito-posterior positions. The following are the chief reasons for such confusion: 1. In the vast majority of such positions the occiput easily rotates to the front as soon as the first-coming part of the head reaches the pelvic floor. 2. On account of this fact many prefer non-interference in all cases excepting when it becomes actually necessary. 3. Others interfere, as a rule, and think their interference has been effective, without considering Nature's work.

Proper flexion of the head causes the occiput to strike the floor of the pelvis first. The resistance of the latter forces the occiput to the front. It is generally accepted as a sort of obstetrical truism that failure of anterior rotation in such cases is always due to insufficient flexion.

Groups.—Herman goes a little farther and gives good clinical points. He considers that occipito-posterior cases are divided into two groups:

1. *Bregmato-Cotyloid*—when the head is well flexed so that the anterior fontanelle or bregma lies opposite the acetabulum. This is the favorable and more common variety in which the occiput always comes to the front.

2. *Fronto-Cotyloid*—when the head is not well flexed, and as a consequence the frontal eminence instead of the anterior fontanelle lies opposite the acetabulum. This is the unfavorable and less common variety, in which the occiput does not generally come to the front.

Reasons for Imperfect Flexion.—The reasons given for imperfect flexion are often ingenious according to our conception of the laws of physics, but are generally purely theoretical and do not help us much practically.

Reference has been made to the loss of equilibrium or proper relationship between the expelling and resisting forces as a cause of tedious "dry" labor. Following similar lines we may designate the causes of insufficient flexion as follows: 1. Weak uterine con-

tractions. 2. Irregular uterine contractions. 3. Tetanic uterine contractions.

Weak uterine contractions generally lead to erratic uterine contractions or tetanic contraction of the uterus, if labor is much protracted.

Diagnosis.—*Abdominal Examination.* This examination should be carried out according to methods already described. If movements of the "small parts" (fœtal limbs) are felt in front, either on right or left side of patient's abdomen, the child's belly looks to the front. When the movements of the fœtal limbs are felt toward the left front the back and occiput of the child point toward the right rear. The back may also be felt easily in this position. It is learned by the "fundal grip" that the breech is at the fundus. There is, therefore, a right occiput posterior position. If, on the other hand, the small parts are felt moving in front but on right side, and the back of the child on the left and slightly to rear, there is a left occipito-posterior position.

Vaginal Examination. One should also examine carefully by the vagina. Contrary to the rule in normal labor, frequent vaginal examinations are generally necessary in order to obtain an exact knowledge of the position of the head at all stages. Early in labor the small or posterior fontanelle points to either the right or left sacro-iliac joint. The large or anterior fontanelle can be felt more or less easily. This in itself should make one suspect the occipito-posterior position. The posterior fontanelle should always be within reach if favorable progress is being made. As the head advances the large fontanelle should become more difficult to reach. If, on the other hand, the large fontanelle becomes more easy to reach, extension instead of flexion is taking place and the occiput is likely to rotate to the hollow of the sacrum, instead of rotating to the front as described in connection with the mechanism of labor. We have thus produced what is called persistent or difficult occipito-posterior or face to pubes position. It may be that Berry Hart is correct in saying that no part in the pelvis rotates primarily backward; but from a clinical standpoint it is convenient to have in our minds the backward rotation of the occiput rather than the forward movement of the forehead. In some cases the ear of the babe forms a good guide, as the pinna and lobule pass from the side of the head toward the occiput. Introduce the finger, or fingers, into the vagina alongside of head until

the ear is reached. If the lobule points to the front the occiput is anterior; if to the back, it is posterior. It is generally easier to feel the anterior ear. Pass the finger or fingers toward the front in searching for the ear.

TREATMENT

Having in view the causes of the failure of anterior occiput rotation, we divide these cases into two classes:

1. Those in which the pains are strong.
2. Those in which the pains are weak or irregular.

In the first class no treatment is necessary as a rule. The normal uterine contractions pushing the head against the ordinary resisting forces produce proper flexion, with resulting anterior rotation of the occiput and normal expulsion. These regular and effective contractions may commence days after the rupture of the membranes and result in normal expulsion, as already mentioned.

In the second class early interference is always advisable, if not actually necessary. In the early part of the first stage pursue the same line of treatment which was recommended for dry labor—i. e., give chloral, morphine, or chloroform according to indications.

General Rules as to Procedure when the Pains are Weak or Irregular.—Rotate the occiput and the back of the body toward the front in the latter part of the first or very early in the second stage.

If the head and shoulders of the child are rotated so as to bring the occiput and back to the front, they will, as a rule, remain in that position.

If the occiput is turned to the front without rotation of the shoulders, the head will, as a rule, rotate back to its posterior position after withdrawal of the hand.

If one is able to turn the occiput to the front, but fails to rotate the shoulders, he should apply forceps, or at least one blade, before the withdrawal of the hand.

Sometimes after correcting the malposition Nature is able to complete delivery, but this is not usual in the cases requiring such interference on account of the abnormal character of the pains. Delivery by forceps is generally advisable. At the same time great care is required when there is secondary inertia, as before pointed out. One should not, however, make the mistake of depending on quinine, strychnia, ergot, or stimulants, or any combination of these, and leaving the patient undelivered for hours after the parts

are dilated. Exaggerated apprehension respecting the dangers of post-partum hæmorrhage as the result of delivery during uterine inertia has resulted in sad consequences in many a tedious labor.

Rotation of Head and Shoulders.—Let an assistant anæsthetize the patient to the surgical degree. We shall suppose that we have the most common variety—the occiput pointing to the right rear. By abdominal palpation we find back of child on the right side and more or less posterior. The left shoulder of the child is in front but on right side of mother's abdomen. By vaginal examination the small fontanelle is found near the right sacro-iliac joint. The large fontanelle is found near the os uteri—generally easily accessible.

Place patient in lithotomy position across the bed. Introduce right hand into vagina and put left hand over the abdomen close to but outside the anterior shoulder of the child.[1] Grasp the head between the thumb and four fingers of the right hand and, during an interval between pains, turn the occiput forward. Sometimes it is impossible to rotate the head until it is pushed upward to some extent. It may be necessary to push it above the brim. In certain cases the head is impacted in the pelvis so firmly that it can neither be rotated nor pushed upward. This is likely to happen only when interference has been too long delayed. At the same time, with the left hand on the abdomen, push the anterior shoulder toward the mother's left side.

I have found, in a somewhat large proportion of cases, that it was impossible for me to push the shoulder over to the other side of the abdomen by external pressure. Especially is this the case when there is tetanic contraction of the uterus. When I am unable to do any satisfactory work with the external hand I frequently pass the right hand beyond the head and rotate the shoulder with the hand in the uterus.

Grandin and Jarmin depend on internal manipulation alone in all cases, and recommend us to introduce the hand and grasp the fœtus (they do not say how or where, but I presume they grasp the body in any way they can) and rotate in its long axis until the occiput is anterior. Some of our English friends object strongly to this procedure, because they consider it both unnecessary and dangerous.

[1] McIlwraith introduces his left hand into vagina and puts the right hand on the abdomen.

It is always well, however, to try the conjoined manipulation first; but in case of failure by this method, try at once to rotate the shoulders with the internal hand. Many of those who deliver with the woman on her side prefer to introduce left hand into vagina and place the right hand over the abdomen.

As before pointed out in connection with dry labor, in which we have such a large proportion of difficult occipito-posterior positions, it is often necessary to commence our manipulations before the parts are properly dilated. Endeavor to do so before the uterine inertia gives place to tetanic spasm. Definite rules can scarcely be given, but one should always keep in view the advisability of interference, which should be undertaken too early rather than too late. If one waits until the completion of the first stage —i. e., until the parts are dilated—he will often be too late.

The history of manual rotation of occipito-posterior cases in Toronto is somewhat interesting. Many years ago Hodder, the elder Ross, Uzziel Ogden, and others, were much influenced by the teachings of Smellie, Leroux, Meigs, and Hodge, and made various endeavors to effect rotation by the fingers or hand. Algernon Temple, Macdonald, Baines, the younger Ross, Chas. J. Hastings, McIlwraith, and others, including myself, now in active practice, worked on similar lines, and nearly all at the present time rotate the head in the way I have described when we consider interference necessary. How far we agree as to when interference is actually necessary I can not say.

Many, if not the majority, of British obstetricians do not consider this manual rotation either a scientific or practical method; many of them do not even think it possible. Herman, however, recommends the combined external and internal methods which have been described, but does not favor the internal manipulation alone.

Other Methods of Rotation.—*Forceps.* A brief reference may be made to other methods of rotation. Some use the forceps for the purpose. I have had no experience in this procedure, which I consider much less effective and much more dangerous than manual rotation.

Flexion.—This is considered the scientific method of treatment. Posterior occiput rotation is due to want of flexion. We are asked to treat the cause. Produce flexion by pushing up the forehead or by firm resistance of fingers directed toward the fore-

head during a pain. Or produce flexion by bringing down the occiput by means of the fingers or by a vectis. So far as my experience goes these methods are useless.

Delivery by Forceps.—The application of the forceps is quite justifiable in some cases. This is true especially when one first sees the patient late in labor and finds so much swelling that he can not feel the sutures and fontanelles. (Try the ear touch, however, in such cases.) The forceps are also indicated when one is unable to rotate, as, for instance, in case of extreme tetanic contraction and when the head is impacted in the pelvis. Milne Murray considers that the forceps are indicated when the occiput remains posterior during descent, and when anterior rotation begins, but is checked at such a stage as to leave the head impacted in the transverse diameter of the cavity. He also says, in comparing manual rotation with the use of the forceps, that he has given the method (manual rotation) a careful trial in many cases of occipito-posterior, and has come to the conclusion that the cases in which it seems to be effective are just those cases in which the occiput would have come forward if left alone. Why, after careful trial, an obstetrician so skilled fails to accomplish in difficult cases what we in Toronto undoubtedly do frequently with comparative ease, I can not explain. The application of the forceps with the ordinary pelvic curve high up is somewhat dangerous, because the blades grasp the head in such a way as to undo flexion during traction and are also apt to slip. On the other hand, with the straight forceps it is difficult to apply the blades in such a way that they will not slip off during traction. Murray uses special forceps, with the curves much flattened, for these cases. A preliminary application of the forceps reversed while the head is fairly high has been recommended. After slight traction on the occiput the forceps are withdrawn and reapplied in the ordinary way.

Extraction by forceps in the ordinary way is not uncommon in the Rotunda, Dublin. When anterior rotation of the occiput takes place the forceps are removed and reapplied. If the occipito-posterior position persists, the handles of the forceps are carried well forward over the mother's abdomen until the occiput is born, and then in the opposite direction as the face passes beneath the pubic arch.

Postural Treatment.—We are told by some that the woman ought to be placed on the side to which the front of the child looks.

Thus, in the position which we have been considering—i. e., occiput right posterior—the woman should lie on her left side. I shall make no objection to this, although I do not know that it accomplishes much. We are told by others that the woman ought to be placed in the genupectoral position and retained there as long as her strength permits. I consider this a useless species of cruelty which is never justifiable.

Preventive Treatment.—I mention preventive treatment now, although it should generally come first. Herman recommends the following treatment when the diagnosis is made before rupture of the membranes. When the occiput is right posterior, put the hands on abdomen, the right behind the child's anterior shoulder, the left in front of the posterior shoulder, then by a number of movements push the anterior shoulder toward the left and the posterior shoulder toward the right side. The back of the child is thus brought to the front if there is sufficient liquor amnii. Then leave the labor to take its natural course.

I have sometimes employed this method. In one case, occiput right posterior, I pushed the child's back toward mother's front. The child's body was turned so easily that the back went past the median line before I noticed it, and I feared that I was converting an occiput right posterior to a left posterior. After further manipulation the head became engaged in the pelvis, the occiput to the left front. Then labor proceeded normally and child was delivered without further interference.

It is difficult to push the back exactly the right distance, and it is possible to undo flexion or displace an arm by such manipulation. If the pains are fairly strong, as before stated, these cases nearly always progress favorably when the patient is left alone. I think in the great majority of such cases Nature can do her work better without the interference of the physician.

In conclusion, the following rules for treatment are recommended:

1. When the pains are strong and regular do not interfere, but leave the case to Nature.

2. When the pains are weak or irregular or both, interfere as soon as possible.

3. When the occiput can not be rotated to the front by manipulation, apply the axis traction forceps and extract, carrying the

handles well forward until the occiput is delivered and then backward as the face passes beneath the pubic arch.

LABOR OBSTRUCTED BY FAULTY CONDITIONS OF THE SOFT PARTS

Cervix.—Rigidity of the cervix is a somewhat frequent cause of partial obstruction to labor. The rigidity may be due to spasm, or to hypertrophic elongation, or to inflammatory induration, or to apparent atresia (conglutinatio orificii externi), or to cicatricial stenosis. The most common of these is spasm of the external os. There is sometimes rigidity of the internal os, which is called by some trismus uteri. It is said that there occasionally exists a contraction of Bandl's ring, but such contraction without general tetanic contraction above the ring must be exceedingly rare.

Treatment. Administer chloroform to the surgical degree, as recommended for rigidity of cervix in dry labor, and dilate with the fingers. Crucial incisions have been recommended, but I have never found them necessary. Generally the cervix is easily dilated when the patient is fully anæsthetized. If this can not be accomplished in the way described, there is generally some very serious condition requiring an abdominal section. Certain hydrostatic dilators were used for dilating the rigid cervix, especially a few years ago, but many obstetricians have found them unsatisfactory.

The administration of chloral, as before recommended, frequently produces an excellent effect. Some apply a solution of cocaine to the cervix. McIlwraith has found this very satisfactory in certain cases. He soaks a pledget of absorbent cotton in a 5 per cent. solution of cocaine, and places this over the cervix (preferably introducing it through a speculum). Garrigues recommends a rectal suppository containing cocaine gr. ss.

The hot vaginal douche is quite commonly used to overcome rigidity of the cervix, but I have never found it accomplish much. It was formerly the custom on the part of many to apply the forceps after partial dilatation and to use traction to complete the dilatation. In unskilled hands this is a very difficult operation, and under any circumstances is, I think, not so safe and satisfactory as manual dilatation. Reference is also made to this in the chapter on The Forceps.

Abnormalities of Vagina and Perinæum.—These may cause obstruction to labor. The most common are congenital malfor-

mations of vagina, incomplete vaginal atresia caused by accidental complications, the results of disease or tears in former labors, neoplasms of the vagina, cicatrices of perinæum, and tetanic contraction of the levator ani muscle. In cases of spasm of this muscle a tense ridge can be felt on each side of the vagina about an inch from the vulva.

Treatment. The treatment of these various abnormal conditions is to a large extent similar to that proposed for rigidity of the cervix. Depend chiefly on chloroform anæsthesia and manual dilatation. Sometimes cicatrices should be incised. Partial vaginal atresia due to inflammations or diseases, such as diphtheria, smallpox, and syphilis, may constitute an insurmountable obstacle to delivery in the ordinary way and render cœliotomy necessary.

Dystocia from Conditions due to Operations for Retroflexion of the Uterus.—Ventro-fixation sometimes causes serious symptoms and dystocia during a succeeding pregnancy and labor. When the fundus has become adherent to the abdominal wall the anterior uterine wall can not expand as pregnancy advances. As a consequence there is considerable distortion of the uterus. The cervix is generally dragged upward to such an extent that it can scarcely be reached by ordinary digital examination. The patient suffers much during the latter part of pregnancy. During labor the bag of waters is pushed down toward the front wall of the uterus and not toward the os. As a result dilatation of the cervix does not take place without artificial assistance, and tetanic contraction and rupture of the uterus may ensue.

Vagino-fixation is probably even worse than ventro-fixation. In ventro-fixation the fundus is firmly stitched to the fascia and perhaps also to the muscles of the abdominal wall. In vagino-fixation the fundus is stitched to the anterior vaginal wall. This causes still greater distortion, suffering, and difficulty in pregnancy and labor.

Obstetricians and gynæcologists now generally agree that neither of these operations should be performed during the child-bearing period; also that suspension of the uterus is quite safe and justifiable. In suspension the uterus is simply attached to the peritonæum in such a way that two new peritoneal ligaments are formed which help to hold the fundus in proper position.

Treatment. It is generally necessary to assist cervical dilatation manually, the patient being anæsthetized. Dilate the vagina

and introduce the hand and dilate the cervix with finger or fingers. It may be necessary to introduce the whole hand into vagina and to dilate cervix with thumb and fingers. Sometimes, especially after vagino-fixation, Cæsarean section must be performed.

Ovarian Tumors.—Reference has already been made to the presence of abdominal tumors before and during pregnancy, and especially to fibro-myomata of the uterus. The presence of an ovarian tumor is a very serious complication of pregnancy and labor. Frequently, probably in the majority of cases, the diagnosis is not made before the onset of labor. In quite a large proportion of cases the tumor is the slow-growing dermoid.

Treatment. When discovered during pregnancy the tumor should be removed by laparotomy. When first discovered during labor removal by operation is now generally recommended. After removal of the tumor, suture the abdominal wound, allow the labor to go on in the ordinary way, but apply the forceps as soon as possible. Some prefer a Cæsarean section immediately after ovariotomy rather than allow the patient to go through labor after a severe operation. If the tumor is in such a position that it does not interfere with labor, or if it can be easily pushed out of the way, an operation may not be necessary. Any extended efforts at reposition, or any such procedures as tapping, as formerly recommended and practised, are now generally forbidden.

After spontaneous labor without operation the patient is still exposed to danger, especially peritonitis following gangrene of the tumor from pressure during the passage of the child. The patient should be carefully watched during the puerperium. If untoward symptoms arise from injury to the tumor, operative interference is urgently required. In any case the tumor should be removed as soon as possible after labor.

Other Abdominal Tumors.—Tumors of various abdominal organs, such as kidneys, spleen, liver, pancreas, omentum, etc., may cause dystocia. No definite rules can be laid down as to treatment. Surgical interference, such as removal of the tumor or Cæsarean section, may be necessary. In other cases version or the application of the forceps may be sufficient.

Vaginal and Vulvar Tumors.—Tumors originating in the vaginal wall are rare. Occasionally cysts require puncture, and tumors such as fibroids or cancer require removal. Tumors starting from

other organs are not uncommon, as, for instance, polypus of the cervix uteri. Cœliotomy, etc., may be necessary.

Distended Bladder.—Retention of urine should be relieved by catheterization. It is sometimes difficult to pass a catheter. The meatus is often displaced forward and the urethra lengthened by stretching. Instead of the ordinary female catheter, which is too short, and the soft-rubber catheter, which is too flexible, it may be necessary to use a male metal catheter. One made of soft metal which can be bent is the best kind to use.

Cystocele is a prolapse of the posterior wall of the bladder with the anterior wall of the vagina. It sometimes projects through the vulva, and has been incised in mistake for a bag of waters. It may be detected by digital examination. The fingers can be passed behind but not in front of the projection. The most certain test is the passage of a sound or catheter through the urethra into the cystocele. There are two dangers arising from cystocele: first, obstruction to labor; second, sloughing of part carried down in front of head and subjected to pressure.

Treatment. Draw off the urine with a catheter and push up the tumor if necessary, or puncture the cystocele.

Calculus in the Bladder.—A stone in the bladder has been known to cause dystocia during labor.

Treatment. Push the stone above the brim, if possible. If this can not be done, dilate the urethra and extract the stone. If the stone can not be thus extracted, perform a vaginal cystotomy in preference to crushing, which involves danger to the soft parts.

Rectocele.—Occasionally there is prolapse of the posterior wall of the vagina with anterior wall of the rectum. In such a case we may find it projecting from the vulva. It is possible also for a coil of intestine to come down in Douglas's pouch and project externally, being covered only by the vaginal wall. An accumulation of large, hard scybala may obstruct labor.

Treatment. Inject a couple of ounces of warm sweet oil or glycerine, break down the mass and scoop it out.

Carcinoma of the Rectum.—This does not frequently interfere with the passage of the child. When it is likely to do so, Cæsarean section should be performed or labor should be induced if the child is alive. In a patient seen with Dr. McPhedran and Mr. Cameron fourteen years ago in the Toronto General Hospital, we decided to induce premature labor. This was accomplished without any

difficulty, and mother and child went out of the hospital alive two weeks later.

Hæmatoma or Thrombus of the Vagina or Vulva.—This is a collection of blood in the submucous tissue of the vagina low down or in the connective tissue of the vulva generally confined to one side, due to rupture of veins. It frequently commences close to the vaginal outlet on one side and extends thence up the vagina and outward toward the labium. Occasionally it is a cause of obstruction to labor. It is said to occur only once in 2,000 or 3,000 labors.

I saw with Dr. Jas. M. Macallum, in 1888, a patient who had a vaginal thrombus which was ruptured during labor. There was slight hæmorrhage following the rupture, but the descent of the head soon stopped it. After the birth of the child there was an alarming recurrence of the hæmorrhage, which we finally stopped by pressure by means of a vaginal tampon and a pad over vulva kept in position by a T bandage. The late Dr. Muir, of Truro, N. S., reported a similar case shortly before.

In 1890 a patient in the Burnside went through labor without any untoward symptoms and without interference. During the night there was much pain in the vulva, and we found on the following day a large swelling in the right labium majus, which was still causing great pain. An incision was made in a line parallel to the long axis of the body, the clot (larger than a cricket ball) was removed, the bleeding was easily controlled by pressure with an antiseptic pad, and the wound was quite healed in a few days.

A thrombus of this sort may be formed some time after labor. A few months ago a primipara, aged thirty-five, had a normal labor. Puerperium normal for three weeks. On twenty-second day after labor went for a short drive in an easy carriage. During the same evening was seized with pain in left side of vulva. Pain shortly extended to rectum. On the following morning I found swelling in left side rather deeply seated and pressing slightly on rectum. Pain relieved for a few nights with opium suppositories. At the end of a week the swelling was smaller, and entirely disappeared in about a month.

It is supposed that varicose veins predispose to hæmatoma. It happens, however, that in the four cases which have come under my own observation varicose veins preexisted in only one instance. The smaller blood tumors in the vulva or vagina are frequently

absorbed. The large ones generally require treatment by simple incision and pressure to stop hæmorrhage, as mentioned in the case of the Burnside patient. When there is no interference the tumor may rupture at any time with serious or even fatal hæmorrhage, or suppuration may occur and the symptoms of septicæmia.

Treatment. It is better not to interfere with small thrombi. The application of the ice-bag or ice-water coil, as recommended by some, is likely to do more harm than good. Every thrombus in this region which causes severe pain should be incised. If pain develops in a thrombus, no matter how small, it should be incised before suppuration occurs, if possible. The blood clots should be thoroughly cleared out, and the bleeding stopped by sutures or pressure, or both. Some obstetricians advise the packing of the cavity with iodoform gauze. One may, however, find no cavity in the vulva even after the removal of a large mass of clots. There is so much elasticity in the tissues that the cavity that contained the thrombus disappears very rapidly after the removal of the latter.

Œdema of the Vulva is not uncommonly so great as to interfere with labor. In some cases the passage of the child injures the œdematous tissues.

Treatment. Try pressure with an antiseptic pad and T bandage. If this is not sufficient, make numerous punctures in the œdematous tissue.

Carcinoma and Sarcoma of the Uterus are sometimes discovered during pregnancy or labor. Of these, the more important from an obstetric standpoint is the carcinoma, which is very apt to attack the cervix and obstruct labor.

Treatment. Perform hysterectomy, or induce premature labor, or perform Cæsarian section.

PRECIPITATE LABOR

Precipitate Labor is worthy of consideration on account of the risk of certain accidents to mother and child. Very strong uterine contractions may cause the expulsion of the child before the mother can reach her bed. In connection with normal labor, reference was made to cases in which the child was expelled while the mother was at stool. The child may be born when the mother is standing upright. The chief dangers to the mother are lacerations

of the cervix, vagina, pelvic floor, or perinæum, or even rupture of the uterus. The child may be injured by falling into the pan of the water-closet or on to the floor. The cord may be torn, but the laceration thus violently produced is not generally accompanied by profuse hæmorrhage. Cases are reported, however, in which fatal hæmorrhage has occurred after such a laceration. Sometimes such rapid expulsion of the child is not followed by strong uterine contractions. Excessive post-partum hæmorrhage under such circumstances is rare.

Treatment.—Chloroform may be administered, and unduly rapid expulsion may be prevented by counter pressure.

CHAPTER XVIII

MALPRESENTATIONS AND ABNORMAL CONDITIONS OF THE FŒTUS

MALPRESENTATIONS

Shoulder, Arm, and Transverse Presentations.—In these presentations the long axis of the fœtus does not correspond with that of the uterine cavity, but lies obliquely or transversely. After rupture of the membranes the arm is sometimes prolapsed and thus becomes the presenting part. The shoulder, abdomen, back, or any part of the trunk may present. These presentations occur about once in 200 cases.

Fig. 132.—Diagram Illustrating Locked Twins. (American Text-Book.)

Causes. These may be briefly enumerated: 1, Immaturity of fœtus; 2, the death or maceration of the fœtus; 3, a contracted pelvis, especially in conjugate diameter; 4, spinal deformity; 5, hydramnios; 6, laxity of the uterine muscle.

Varieties. There are two varieties, of which the first is the more common: 1, dorso-anterior, and 2, abdomino-anterior. In either, the head may be on the right or the left side.

Prognosis. The prognosis is unfavorable to both mother and child, the mortality being, for the mother, 1 in 9, for the child 1 in 2.

Diagnosis. By abdominal palpation. The size of the uterus

is increased transversely. The head is generally felt in one iliac fossa, and the breech in the opposite flank generally higher up, while a resisting plane connects the two. Nothing can be detected before labor by digital vaginal examination because the presenting part is high. The bag of waters is unusually large and long. After labor commences the shoulders may be felt.

Fig. 133.—Fœtus with Ascites. (Tor. Univ. Museum.)

Note.—The hand may descend with the head or breech. To diagnose which hand this is, apply your right hand to the hand of the child, and if your palm corresponds with palm of the child it will be right, if not it will be left. A right hand means right shoulder, etc.

Terminations. There are several terminations possible: 1. Spontaneous version. The head or breech is substituted for the shoulder by uterine contractions and a molding process by which the uterine cavity becomes ovoid and the long axis of the child becomes vertical. 2. Spontaneous evolution. The head is fixed above the pubic joint, and the neck jammed against the pubes. The anterior shoulder is fixed at the subpubic ligament. The thorax is driven down below the shoulder and the body becomes doubled on itself. The breech is forced into the hollow of the sacrum and then lower until it is expelled. The legs follow the breech, the thorax follows the legs, and the head is expelled last. 3. Evolution with doubled body. The fœtus may be delivered doubled (rare). Results in neglected cases (usual) are very serious. The membranes rupture and the liquor amnii drains away. The uterus contracts and may rupture. The fœtus dies. The patient sinks from exhaustion or septicæmia.

Treatment. Version, either cephalic or podalic, may be performed either by external, combined external and internal, or internal manipulation. As a last resort, decapitation or some other form of embryotomy, or abdominal section, should be done.

Complex Presentations.—When more than one part of the fœtal body presents, it is spoken of as a complex presentation—e. g., a hand with a head, a foot with the head, or a hand with a foot.

Treatment. When a hand presents with the head there are four methods of procedure. 1. Push up the hand, if possible, and keep

Fig. 134.—Anencephalus with Meningocele and Spina Bifida.

it up until the head is engaged in the pelvis. 2. Perform version. 3. Deliver with forceps. 4. Leave the case to nature. When a foot presents with the head, push up the foot, if possible, or pull down the foot and push up the head, producing a pelvic presen-

tation. When a hand and foot present, push up the hand, but depend mainly on pulling down the foot and converting the presentation into a breech.

Dorsal Displacement of the Arm.—This term is used when the arm is so displaced that the forearm lies transversely across and behind the neck. It is called by Barnes the nuchal hitching of the arm. It is very difficult to diagnose, not generally being discovered until the forceps have been applied and failed to deliver.

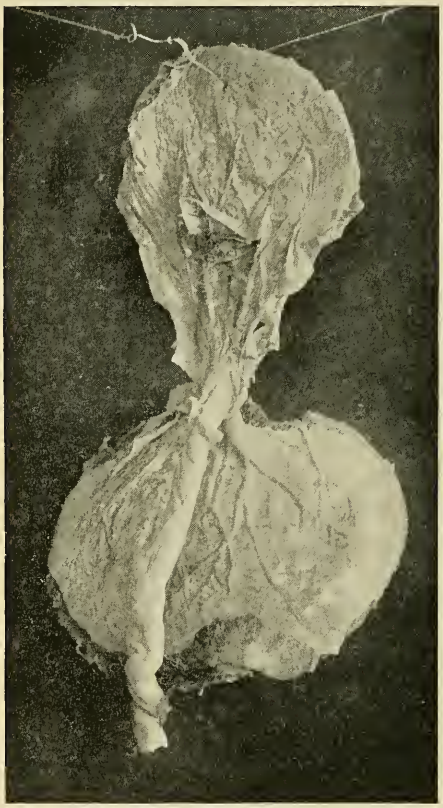


Fig. 135.—Double Placenta. (Tor. Univ. Museum.)

Treatment. Three courses are left open: 1. Perform version under chloroform. 2. Bring down the arm over the side of the head, converting it into a presentation of the head and arm. 3. Push the head above the brim and rotate in the direction of the child's fingers so as to unwind the arm from the neck.

Prolapse of Umbilical Cord.—The accident may happen when there is: 1. An excess of liquor amnii. 2. A premature rupture of the membranes. 3. An abnormal presentation. 4. An abnormal condition of the cord, such as great weight, length, etc.

It is easy to diagnose from hand or foot by shape, pulsation, etc. The chief danger is that the cord may be compressed during delivery and the pressure stop hæmatosis, and cause asphyxia—similar to suffocation or pulmonary embolism in extra-uterine life.

Treatment. Three methods of treatment are advised. 1. Replace the cord. This may be accomplished in three ways: (*a*) The fingers carrying it up and retaining it until the head has descended, the woman being in semiprone position. (*b*) By repositor, the simplest kind being made from a gum-elastic catheter. Make a hole opposite the eye, pass a loop of tape through both holes; secure a loop of cord in the loop of tape, but do not pull too tightly; pass the catheter into the uterus with the help of a stylet; withdraw the stylet and leave the catheter. (*c*) By posture. Place the woman in the knee-chest or semiprone position. 2. Apply forceps. 3. Turn after membranes are ruptured.

Fig. 136.—Battledore Placenta (Marginal Insertion of the Cord).

Maternal surface of the placenta, and chorion below with edge of membranes on left side inverted showing a small portion of the amnion.

ABNORMALITIES

Locked Twins. — These may be divided into four varieties. 1. Both heads may present, the first head descend into the pelvis and the second entering the brim may get jammed against the thorax of the first child. When this occurs one head should be pushed out of the way if possible, and by applying forceps the other head should be engaged in the pelvis.

2. A foot or a hand of one child may present with the head of the other. Here, the foot or the hand, as the case may be, should be pushed out of the way to allow the head to engage.

3. The feet of the twins may present together; then one child

should be disengaged as rapidly as possible and the other one pulled down.

4. The heads may lock; that is, the first child may come out

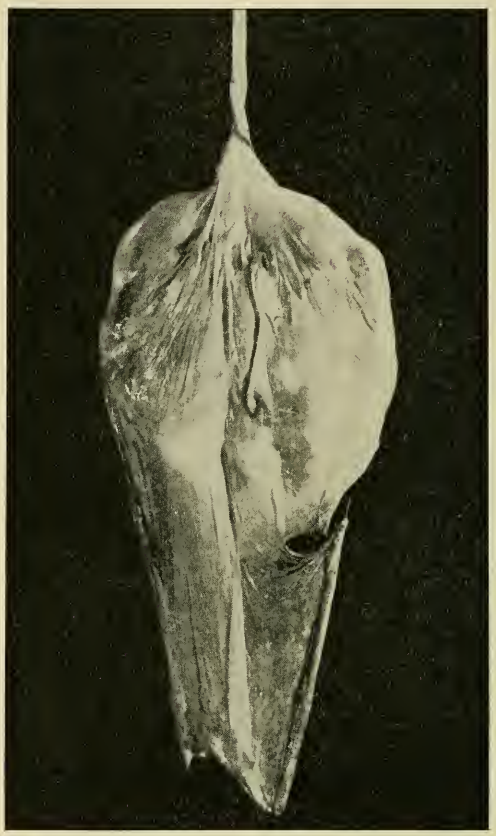


Fig. 137.—Battledore Placenta (Marginal Insertion of the Cord).

Fœtal surface, with a portion of the membranes hanging from lower edge having the glistening amnion on the left side; a portion of the amnion has been removed on the right side, below, showing the fœtal side of the chorion.

feet first and be delivered as far as the head, which is thus found to to be locked with the head of the second child.

Treatment. In such cases there are four different lines of treatment. (*a*) The heads may be disentangled and the second pushed out of the way so as to allow the first to engage. (*b*) The forceps

may be applied to the head of the second child, which is then dragged past the body of the first. (*c*) The first child may be decapitated, the second child being then easily expelled, leaving the first head to come last. (*d*) The lower head may be perforated and extracted with the cephalotribe, or some other means, when the other child will be easily delivered.

Double Monsters.—These may be divided into four varieties (Playfair):

1. *Thoracopagus*—i. e., the two bodies are distinct and separate except where they are united in front, to a varying extent, by the thorax or abdomen. This is the most common of these conditions. In a large proportion of these both children present by the feet, the most favorable presentation. Both bodies go through the pelvis parallel with each other, the posterior head entering the pelvis in advance of the anterior. The bodies should be pulled

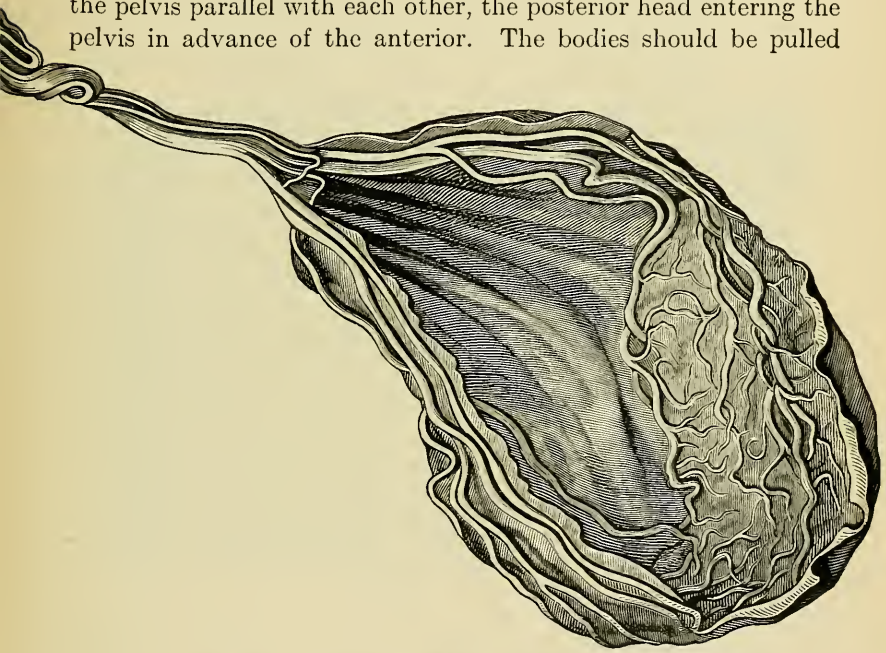


Fig. 138.—Placenta, Insertion Velamintosa (Lusk).

well forward, especially that with the posterior head, to which, if necessary, forceps should be applied. In some cases perforation of the posterior head is necessary. When both heads present, one is generally born first, then the two bodies by a sort of spontaneous evolution, and lastly the second head. This evolution should be

assisted as much as possible. It may be necessary to divide the band of union or perform embryotomy.

2. *Ischiopagus*—i. e., the nearly separate bodies are united back to back by the sacrum and lower part of the spinal column. The children are generally expelled, the first head, then the bodies by evolution, then the second head.

3. *Dicephalous monsters*—i. e., the bodies are united but the heads are separate. The mechanism of delivery is usually the same as in class 2.

4. *Cephalopagus*—i. e., the bodies are separate, but the heads are partially united. This condition is very rare and the delivery difficult, embryotomy being usually required.

Intra-Uterine Hydrocephalus.—This condition is dangerous to both the child and the mother, sixteen out of seventy-four mothers (Keiller) having rupture of the uterus. It is a condition seldom diagnosed before delivery. The head is large and round; the

Fig. 139.—Exomphalos.

sutures and fontanelles are very wide. If the ordinary methods fail and the head is too large to be delivered in any other way, it should be punctured.

Dropsy of the Fœtus.—This is a condition where there is fluid in the thorax or abdomen of the child. It should be tapped. (Fig. 183.)

Acardiac Monster (see p. 186.) This does not usually cause dystocia.

Anencephalus.—This is a monster possessing a trunk and an imperfectly developed head, a large proportion of the brain and skull being absent. On account of the absence of the cranial vault, the face appears to be especially prominent and the eyes pro-

FIG. 140.—PREGNANCY ADVANCED FIVE MONTHS.

Cord twice around the neck and once around the arm. (Tor. Univ. Museum.)

trude. The neck is short and the shoulders comparatively broad, which latter may cause serious dystocia; cerebral meningocele and spina bifida are often associated with it. (Fig. 134.)

Large Fœtus.—The fœtus may be especially large and the skull ossified. Forceps or version should be tried. If these fail, a laparotomy should be done. If this is impossible, perforation is indicated; evisceration is sometimes required where the body is very large.

Anomalies of the Placenta.—There are several anomalies of the placenta. There may be multiple (double, etc.) placenta, and also small accessory portions of the placenta, "placentæ succenturiatæ." The cord may be attached to the margin of the placenta

—"battledore placenta"; or the vessels of the cord may travel some distance through the membranes before reaching the placenta—"inserta velamentosa." The placenta may be abnormally situated. It may be over the orifice of a Fallopian tube; over or near the os internum (placenta prævia); or in the abdominal cavity in extra-uterine or ectopic gestation. There may be infarcts in the placenta, the red infarct being known as apoplexy of

Fig. 141.—Anencephalus with Meningocele.

the placenta. There may be œdema of the placenta, a condition usually associated with hydramnion; or a placentitis, although some deny the existence of the latter. There may be degeneration of the placenta, fatty, calcareous, pigmentary, or cystic, or perhaps syphilitic disease.

Anomalies of the Umbilical Cord.—Its normal length is about twenty inches, but it may be abnormally long or short. There may be torsion or rotation, especially in the seventh month, until the vessels are partially or completely closed. The cord may be

knotted. There may be a hernia of some of the abdominal viscera of the fœtus at the insertion of the cord. The cord may coil around the fœtus; it may become cystic, or its vessels may become stenosed from periphlebitis.

Diseases of the Fœtus.—Diseases may be transmitted by the mother, as in cases of lead or other diffusible poisons, eruptive fevers, malaria, syphilis, and tuberculosis; or it may be a disease of the fœtus alone, the mother being perfectly healthy, such as peritonitis, ascites (rare), hydrocephalus, meningocele, spina bifida, intra-uterine amputations, and injuries caused by falls, etc., of the mother.

Death of the Fœtus.—The death of the fœtus may result from disease of the mother, the placenta, or the fœtus itself. This event is diagnosed by the absence of the fœtal movements which have previously been noticed, and by the ordinary auscultation signs. There is a progressive reduction in the size of the mother's abdomen, and a deterioration of her health. When the fœtus dies it may be expelled soon, or it may be retained for some time ("missed labor"). When retained, it may be dissolved in the liquor amnii, if death occurs at an early period of pregnancy; it may shrivel or mummify; it may be macerated; or it may become putrid. It is now generally supposed that "missed labor" with long retention of the child occurs only in extra-uterine pregnancy or pregnancy in one horn of the uterus bicornis.

FIG. 142.—MACERATION OF DEAD FŒTUS RETAINED FOR SOME TIME IN UTERUS WITH MEMBRANES UNRUPTURED.

Non-putrefactive softening with desquamation of the epidermis resulting from the action of the liquor amnii.

CHAPTER XIX

ABNORMAL CONDITIONS OF THE UTERUS, ITS CONTENTS, AND THE MAMMARY GLANDS

ABNORMAL CONDITIONS OF THE UTERUS

Rupture of the Uterus.—There are two degrees: Complete, involving the muscular tissue and peritonæum; incomplete, involving the muscular tissue alone. The rupture nearly always begins in the lower segment of the uterus, which is abnormally stretched. It is more common in multiparæ and in women over thirty.

Several causes may give rise to rupture of the uterus: 1. Obstructed delivery from contracted pelvis, transverse presentation, hydrocephalic head, or pelvic tumors. 2. Degeneration of the muscular tissue of the uterus. 3. A weak cicatrix after a former Cæsarean section. 4. Violence in using the forceps or turning, tetanic action of retracted muscular tissue, as from early administration of ergot.

There are always some premonitory signs to warn the obstetrician of the approaching danger. The ring of Bandl rises more than 1½ inches above the symphysis. The temperature rises to above 101° F., and the pulse increases in frequency above 110. The uterus becomes tonically contracted, and the round ligaments stand out and become very tense.

Rupture may be sudden or gradual, the latter being more frequent. In sudden rupture severe and continuous pain replaces the rhythmical uterine pains. In addition there is a sudden sharp pain, sometimes accompanied with a snapping noise, which precedes the continuous pain. The respirations become hurried and symptoms of shock and collapse appear. The child gradually recedes to some extent and may even be forced into the peritoneal cavity, although this seldom occurs. Such recession, with mobility of a presenting part previously fixed, sudden pain and collapse, indicate with almost absolute certainty rupture of the uterus. The symptoms of gradual rupture are not nearly so clearly defined as those of sudden rupture, but resemble them to a certain

extent. The condition may not be recognized until the hand is introduced into the uterus to remove the placenta.

Treatment. In some cases when rupture is threatened it may be prevented. An anæsthetic should be administered if the pains are very severe or the patient is becoming exhausted; the child should be delivered as quickly as possible by forceps, version,

Fig. 143.—Rupture of Vagina. (Tor. Univ. Museum.)

etc. If it is possible with safety to correct malpresentations, they should be corrected. In cases of neglected transverse presentations decapitation rather than version should be performed. When the anterior lip of the cervix descends in front of the head it should be pushed back.

When rupture has actually occurred, the line of treatment depends upon the condition of affairs which succeed the rupture. The fœtus may be entirely within the uterus, but the presenting part not fixed. In such cases podalic version should be performed

at once, the child and placenta being rapidly extracted. Version may increase the size of the rent, but it insures rapid delivery and should be performed in all cases. After delivery the rent should be examined, and if it is small, low down, and closed by the uterine

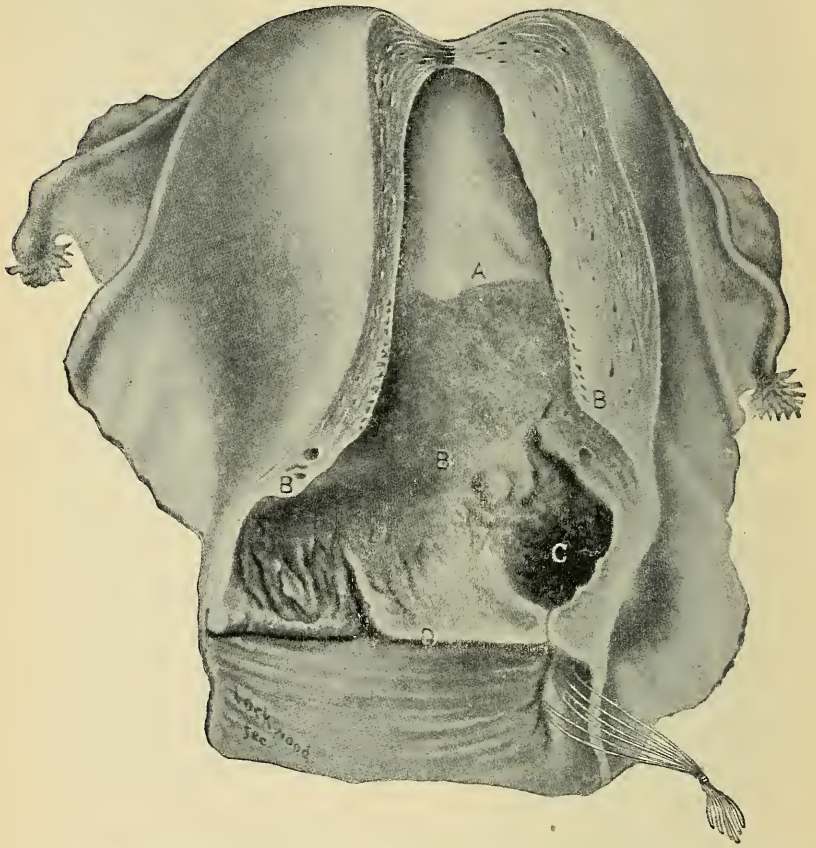


Fig. 144.—Rupture of the Uterus discovered Post Mortem (Williams). *A*, cavity of uterus ; *B, B, B*, retraction ring ; *C*, rupture ; *D*, cervix. Sutures of vaginal tear in place.

contractions, an expectant line of treatment may be adopted. The clots and any débris should be removed, the uterus douched, and a strip of iodoform gauze passed into the uterus up to the fundus. If peritonitis sets in, a laparotomy should be done and the peritoneal cavity washed out. The rent may be large, the presenting part fixed or near the brim, and a part of the fœtal body in the abdom-

inal cavity. When the head is the presenting part the forceps should be applied and the child rapidly extracted. Some recommend perforation before extraction, but this should never be done unless the child is dead. If the breech presents, a foot should be brought down and the child rapidly extracted. The arms may be pulled over the head, but no delay should be made for fear of this, as recommended in an ordinary breech delivery. The child should be pulled down rapidly, the arms brought down when the body is born, and the head quickly delivered. If this procedure is impossible, laparotomy should be done, the child removed, the rent closed, and the abdominal cavity irrigated.

The entire fœtus may have passed into the abdominal cavity. In such cases laparotomy and extraction of the child, as described above, is the best treatment. Fortunately the child very seldom passes quickly into the abdominal cavity. It does occasionally, however, and one should be prepared to act promptly. The accoucheur may be some miles from a hospital, his office, and a physician. He has no suitable instruments, and is perhaps not sufficiently skilful to do a cœliotomy with a penknife. He must do something at once in the majority of cases of this form of rupture. Under such circumstances one should not hesitate. Introduce the hand at once through the vagina into the uterus, then through tear into peritoneal cavity, seize a foot and extract the child by way of the uterus and vagina. Remove the placenta at once and then pack the abdominal cavity as far as possible with iodoform gauze. Also pack the uterus until the hæmorrhage ceases. It may be necessary to pack both uterus and vagina in cases of uterine atony after packing the abdominal cavity. Many years ago, before Lister taught the science and art of antiseptics, the late Dr. W. T. Aikins had a case of this sort. He passed his hand into the abdominal cavity, extracted the child through the utero-vaginal canal, and his patient made a good recovery.

If the rent is extensive and ragged, involving adjacent structures, or if there is sepsis, one should perform a Porro-Cæsarean section, or extirpate the whole uterus. The following summary of directions may prove useful. Deliver quickly and plug with iodoform gauze in the great majority of cases. Perform a laparotomy, when the child has passed into the abdominal cavity, if there are at hand proper appliances and sufficient help. Perform a Porro, or extirpate the whole uterus in exceptional cases.

The treatment of rupture of the uterus by packing with iodoform gauze is now largely accepted as the best in nearly all cases. Its results during recent years show to good advantage when compared with those following the more difficult operative procedures. For instance, Herbert Spencer recently reported twelve cases of rupture of the uterus. In four cases (two complete and two in-

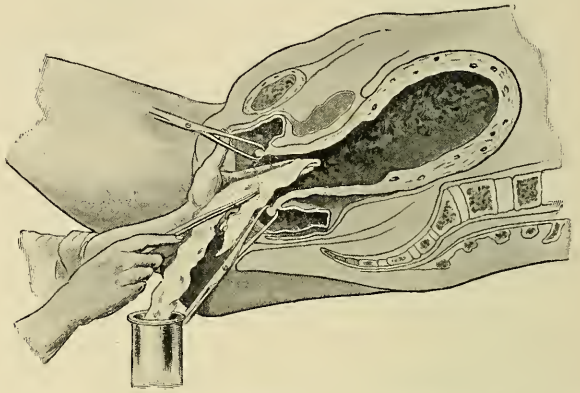


Fig. 145.—Uterine Tamponade after Labor. (Dührssen's method. See p. 353.)

complete ruptures) treated by gauze packing, all the patients recovered. In eight cases with other forms of treatment (including two abdominal hysterectomies), all died.

In this connection we have to consider that serious condition called shock, which we find so frequently in surgical emergencies. We learn from clinical observation that a woman after rupture of the uterus is a poor subject for a cutting operation. And yet, in certain very rare cases, when the child is in the abdominal cavity and can not be pulled through the uterine rent without undue violence, the abdominal section becomes necessary.

There is some difference as to details of the gauze-packing. In the Rotunda they generally pass a thick plug of iodoform gauze through the uterine rent into the abdominal cavity for drainage and to keep the intestines out of the wound, and leave the lower end of the gauze in the vagina. In other words, when there is no serious hæmorrhage they simply use the iodoform gauze to prevent sepsis and act as a drain; but when, on the other hand, there is copious hæmorrhage, they perform an abdominal section and remove the uterus. Many, but not all, use a douche before intro-

ducing the gauze. Herman, in doing so, moves the nozzle of the syringe throughout the whole length of the rent and through the rent into the peritonæum. He holds the perinæum back with the fingers to allow return of the fluid with dislodged clots. He uses plenty of fluid, washes thoroughly, and in cases of emergency uses ordinary tap water without waiting for its sterilization. This douching of the peritoneal cavity is not always necessary, and in cases where there is considerable hæmorrhage is not advisable. Sterilized salt solution is the best fluid for the intra-peritoneal douche.

Dührssen's method differs materially from that of the Rotunda. He passes the gauze through the rent and plugs the abdominal cavity as high as possible, and then the uterine cavity and vagina more or less tightly (the uterus tightly if atony exists). The amount of gauze which can be pushed into the abdominal cavity is not so much as some people think, because the abdomen is not

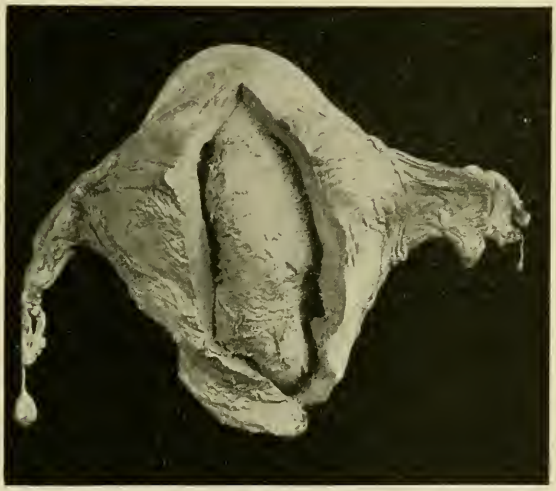


Fig. 146.—Partial Inversion. Posterior Wall of Uterus, Internal View. (Tor. Univ. Museum.)

empty, but fairly well filled. Afterward the tampon, which is easily felt, is pressed from the abdominal walls against the uterus. Complete arrest of very severe hæmorrhage may thus be obtained. Dührssen lays more stress on the arrest of bleeding than upon the drainage action of the gauze, which he considers of secondary importance.

In carrying out Dührssen's method (which I consider the best now known) it is better as a rule to leave the gauze undisturbed for a fairly long time, especially in cases with considerable hæmorrhage. Slow withdrawal of a limited amount each day, from the fourth to the ninth day, when the removal of the gauze should be completed, answers well. As before mentioned, iodoform gauze is not free from risk, especially in anæmic patients, but many of us have found no serious poisoning from its retention from five to nine days.

Inversion of the Uterus.—This is an occurrence that but seldom happens; probably once in 200,000 labors. It may be inverted in part only, or altogether; hence two varieties are described, partial and complete. In complete inversion there are three stages: the fundus is inverted and passed down to, but not past, the

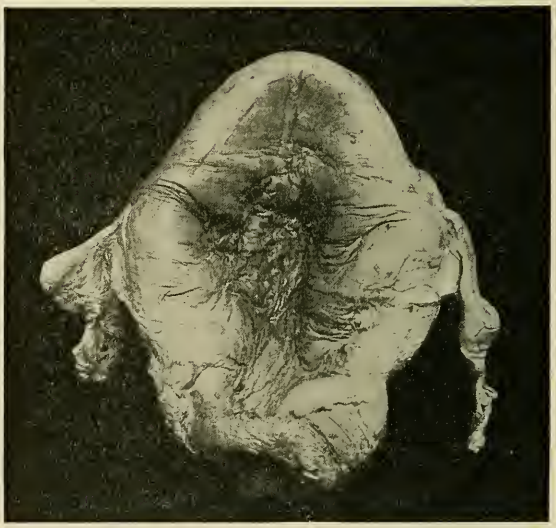


Fig. 147.—Partial Inversion. Posterior Wall of Uterus, External View. (Tor. Univ. Museum.)

external os; the inversion passes through the os into the vagina; the inversion becomes complete.

Traction on the cord, when it is short and there is a precipitate labor, is apt to cause inversion of the uterus where there is uterine inertia. This traction may be injudiciously exerted by the obstetrician. Sometimes the inversion is spontaneous with inertia.

In all cases there is inertia of the uterine walls. Its symptoms are shock and hæmorrhage, with vesical and rectal tenesmus. Abdominal palpation reveals the depression or absence of the fundus, and bimanual examination shows both this depression of the fundus and the presence of a tumor in the vagina. It must be

Fig. 148.—Complete Inversion of Uterus (Bumm).

diagnosed from a fibrous polypus of the uterus, protruding from the os into the vagina, and the head of a second child. The prognosis is bad, more than half the patients dying within a few hours after the inversion has occurred. Shock in most cases is the cause of death.

Treatment. The patient should be anæsthetized, the urine drawn off with a catheter, and the vulva and vagina sterilized. Attempts should then be made to replace the inverted uterus, first by manual pressure and manipulation, and, this failing, by Aveling's repositor or some similar instrument.

RETENTION OF PLACENTA AND ADHESIONS OF PLACENTA

There has been a certain amount of confusion about the terms retention of placenta or retained placenta, and adhesions of placenta or adherent placenta. The simple meaning of the words retention and adhesion should assist in getting the correct idea of the conditions referred to.

Adhesion of the placenta for any length of time after the delivery of the child is extremely rare. As stated in connection with normal labor, separation of the placenta is the first step in the third stage and usually takes place in a few minutes after the expulsion of the child. After separation the placenta passes wholly or partly into the vagina. If there is no interference the placenta is usually expelled by the efforts of Nature in about an hour (more or less). The obstetrician, however, interferes after separation and endeavors to express the placenta by pressure over the fundus in the manner recommended by Credé. In a certain proportion of cases he is unable to do this, and we then have what is technically known as retained placenta. Retention of the placenta is generally due to inertia of the uterus or irregular contraction, generally known as hour-glass contraction of the uterus.

Hour-Glass Contraction.—This is a term applied to various conditions of the uterus, in which the most important element is a constriction of the ring of Bandl or the retraction ring. Among those conditions, which are caused by irregular contractions of various sets of muscular fibers in the uterus and which are included under the term hour-glass contraction, three especially may be named: 1. General atony of the uterus followed by contraction at Bandl's ring. 2. General tetanic contraction of the uterus followed by relaxation of the upper segment. 3. General contraction (probably tetanic) of upper and middle segments of the uterus gripping the placenta firmly without any expelling force.

In a small minority of cases there is adhesion, which is the cause of the retention. Adhesion of the placenta is generally due to disease of the decidua or placenta, which interferes with the proper development of the spongy layer of the serotina where separation should take place. When, as in the majority of cases, it happens that there is intimate adhesion of only a portion of the placenta, with detachment of the remainder, alarming hæmorrhage may ensue.

Treatment for Retention of Placenta.—When the placenta is retained in the uterus, whether it be adherent or not, there is only one plan of treatment. Introduce the hand into the uterus and bring down the placenta. When there is hour-glass contraction one should not mistake the mucous membrane of the lower segment for an adherent placenta. Introduce one hand into the vagina and two fingers into the uterus. Pass the fingers gently and slowly through the constriction. At the same time push the uterus downward by pressure, with the other hand over the fundus. Endeavor then to get the edge of the placenta into the constriction. Pull slightly on the edge thus coaxed into the canal and continue pressure over the fundus. The whole procedure should be a coaxing process slowly performed. When a goodly portion of the placental mass gets into the stricture, relaxation will soon take place with the assistance of the gentle pressure over the fundus. In case of failure with the two fingers, pass the whole hand into the uterus and push the tips of the fingers (pressed together in the shape of a cone) gently through the constriction, pressure being made over the fundus as before described. Push the fingers up between the placenta and uterine wall, and then, if possible, hook the fingers over the upper edge of the placenta and bring it down. It is well in any case of retention, but especially important when there is adhesion, to pass the fingers outside the membranes. When the placenta is reached push the finger-tips between the lower edge and the uterine wall. Continue to separate placenta from uterus until the former is detached in one piece. Be very careful during this procedure to keep steady but firm pressure over the fundus with the other hand. After complete detachment remove the whole placenta as before described. Then reintroduce the hand and examine carefully to ascertain whether any fragments have been left behind and remove them. Some obstetricians use a curette after removing as much as possible with the fingers, but the use of this instrument under such circumstances is so dangerous that I think it should be forbidden.

Sometimes it is impossible to separate the placenta in one piece. In one case I had to separate it piece by piece, and had very great difficulty in detaching certain portions. After the removal of all the fragments I feared that I had left some pieces adherent, but I also feared that I had in places scraped away pieces of the uterine wall. The patient, who had lost much blood, made a good but

slow recovery. Herman says: "I have only once met with a placenta so adherent that I could not remove it entire, but had to scrape it off and get it away in small fragments. The patient, thanks to antiseptic douches, got well." I quote this partly because of the last sentence. If, however, the operator does not introduce any septic matter into the uterus, what need is there for antiseptic douches? My patient, without antiseptic douches, got well.

MASTITIS

Varieties.—Some members of the Dublin School divide mastitis into two varieties: parenchymatous, inflammation of the milk ducts; interstitial, inflammation of interstitial tissue. This classification, while not quite correct either clinically or anatomically, is much better than the old classification of Velpeau so generally accepted for many years, into superficial or subcutaneous, glandular, and submammary.

There is but little known about the pathology of the milder forms of mastitis. It is probable, however, that bacteria sometimes enter the breasts through the milk ducts, giving rise to the parenchymatous variety; and sometimes (more frequently I think) by means of the lymphatics passing through an excoriation or fissure into the interstitial tissues, hence the interstitial variety.

Symptoms.—There is sometimes a hard, painful lump, fairly well defined—i. e., with a sharp line of demarcation between the inflamed and healthy portions of the gland. This is at first usually triangular in shape, with the apex at the nipple. Jellett thinks that this form of inflammation is parenchymatous and generally tends to subside. Whether this is correct or not I can not say, but we certainly do find a distinct lump of this kind sometimes disappear under appropriate treatment. On the other hand, we sometimes find a diffused irregular swelling which can not be clearly and definitely located. This is probably interstitial, and more often tends to suppurate.

In both varieties the whole breast is generally at first distended and painful. A certain portion soon becomes more painful. The local signs are soon accompanied by severe constitutional disturbances, such as furred tongue, rapid pulse, higher temperature, and general malaise. In severe cases suppuration soon occurs, forming the ordinary mammary abscess. It is frequently, if not

generally, impossible to recognize the presence of pus by the detection of fluctuation, but the presence of œdema over the painful portion may be considered a positive sign of abscess. In some cases there is no general distention and pain, the first symptom being localized pain with more or less hardness. In any case where

Fig. 149.—Breast of Pregnancy.

Showing extensive pigmentation of the skin over and beyond the breast, striæ on breast, areola, slight secondary areola, tubercles of Montgomery, and normal nipple.

the constitutional and local symptoms have continued for forty-eight hours, one should conclude that there is pus, and at once institute proper treatment.

Frequency.—Statistics as to frequency vary greatly. Some authorities state that about 6 per cent. of the nursing women are

afflicted with mastitis. In our Burnside Maternity the percentage is certainly less than 1 per cent. One can not give exact figures about mastitis because of the difficulty of distinguishing between painful breast engorgement and mastitis, but one can speak definitely as to mammary abscess. Out of two thousand consecutive cases at our Burnside Maternity there have been six mammary abscesses; of these, two had mastitis when admitted,

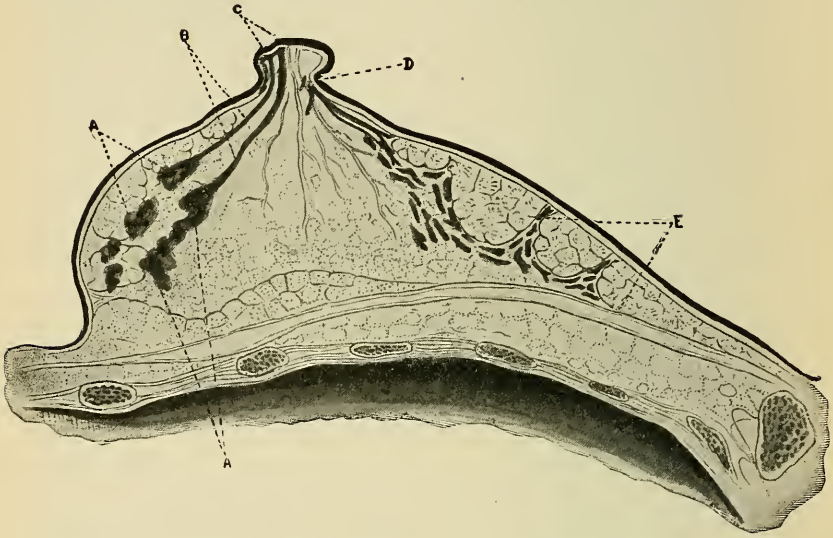


FIG. 150.—*A*, Parenchymatous mastitis; *B*, infected milk ducts; *C*, erosion of nipple; *D*, fissure at base of nipple; *E*, interstitial mastitis.

three were attacked within a very short period, while things were going "queer," and the other had a very severe mastitis with abscess, probably through some error in our technique. A great deal depends on the nursing in these cases, and it is very important for one to become skilled in technique and thus able to properly instruct the nurse.

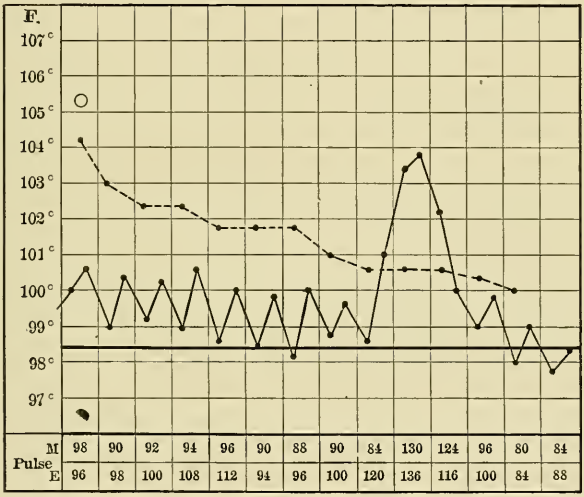
TREATMENT

Two things should be kept in view in connection with the prevention of mastitis: 1. The care of the nipples. 2. The use of the breast-binder.

The Care of the Nipples.—In speaking of the hygiene of pregnancy and also of the puerperal state, some directions have been

given as to the care of the nipples. Although differing from many excellent obstetricians I desire again to express the opinion that any efforts to harden the nipples by the application of spirit lotions are harmful. If any application is made it is better to use something which will soften the surface of the nipples, such as lanolin, because a soft or a softened nipple will not crack so readily as a nipple hardened by astringent or spirit lotions.

There are four varieties of troublesome nipples that will require treatment. (For directions as to flat or inverted nipples, see page 158.) 1. Sore nipples cause great, sometimes intolerable, pain, and are also predisposing causes of mastitis. There are three varieties: excoriation, fissure of the summit, and fissure of the base. 2. Excoriation of the nipples is caused by maceration and destruction of the epithelial covering. A raw surface is produced,



Pulse														
M	98	90	92	94	96	90	88	90	84	130	124	96	80	84
E	96	98	100	108	112	94	96	100	120	136	116	100	84	88

Fig. 151.—Chart showing Rise of Temperature from Sore Nipples.

looking like a small strawberry, and very painful when touched. 3. Fissure of the summit is a linear ulcer running generally from the circumference to the center. 4. Fissure of the base is a linear ulcer running transversely, and is generally the worst form of sore nipple.

In all cases wash the nipple after nursing. For ordinary excoriation apply first a mixture of castor-oil and bismuth (equal

parts), as recommended by Hirst. This mixture may also be applied to a slight fissure of the summit. If this does not effect any improvement, apply orthoform—either in the form of a powder or an ointment having 10 per cent. orthoform and 90 per cent. lanolin. The orthoform is a mild antiseptic, and also produces local anæsthesia, which lasts for some hours after its application. Another plan of treatment in the Burnside is to carefully wash the nipple after nursing with a solution of boric acid; then apply a solution of carbolic acid, 1–40; then soak some absorbent cotton in a solution of boric acid, place it over the nipple and have it retained in position by the breast-binder. In other words, wash nipples, apply carbolic solution, and then apply a boracic poultice and retain it until the next time of nursing. A piece of oil silk or gutta-percha tissue may be placed over the poultice.

In case of fissure of either the summit or the base, nothing is more satisfactory than the application of the solid stick of nitrate of silver, as our fathers used it long ago. The parts should be thoroughly dry. Separate the opposed surfaces, apply the stick lightly to bottom and sides of the fissure, and if the fissure is deep apply absorbent cotton between the two surfaces. After opposing surfaces have become healthy in appearance apply the compound tincture of benzoin, two or three layers, with a camel's-hair brush.

When nursing causes extreme pain after treatment as described, use a nipple-shield. This is at first refused by the baby, as a rule, but a good nurse can generally get the baby to take the shield after a few trials. Apply the flat surface tightly to the breast, and if the child will not seize the rubber nipple, or will not retain it, press a little milk into the shield with the fingers placed on the surface of the breast outside the base. Miss MacKellar finds in the Burnside that the best form of nipple-shield is one made of glass with an india-rubber teat attached. I also use this kind in my private practice. After using a shield, always wash it carefully and then place it in a saturated solution of boric acid until again wanted. While the nipple shield generally answers a good purpose, it happens occasionally that it can not be used. This is true especially in the bad form of fissure of the base, when the drawing of the nipple into the shield opens the opposed surfaces at each nursing.

It is sometimes necessary to stop nursing for a time—two, three, or four days, or sometimes altogether—i. e., to "dry the breast."

When the breast is given a rest as to nursing it becomes distended with milk. If such distention is present notwithstanding the use of the breast-binder, it should be relieved by the process of milking the nipples with the fingers, much as a milkmaid milks her cow, or by the use of the breast-pump.

The Use of the Breast-Binder.—In speaking of the puerperal state I referred especially to the use of the breast-binder for distention of the breasts a few days after labor. The judicious use of such a binder prevents much discomfort as well as actual pain, and also tends to prevent mastitis.

Massage.—I desire to return to this subject and refer to the procedure in connection with pathological conditions of the nipples or breasts. The use of the breast-binder fortunately makes massage absolutely unnecessary for what may be called physiological fulness or distention of the breasts. In certain cases, however, which appear to be, or are actually becoming, pathological, in spite of the use of the binder or careful treatment of the nipples, a modified form of massage sometimes has a good effect. I do not refer in this connection to rubbing from the circumference toward the nipples, but to an altogether different sort of massage which I have used lately, and which, as far as I know, was first described by Bacon of Chicago. The fulness of the breasts after labor is not primarily due to an accumulation of secreted milk, but rather to a distention of the blood and lymph vessels. The object of the modified massage is to relieve the painful engorgement by emptying the congested vessels. Bacon does this by beginning outside of and above the breast and rubbing in the direction of the venous and lymph flow toward the axillary and subclavian trunks. After the surrounding area is massaged, the breast itself, or a portion of it near the periphery, may be gently rubbed, but always in a direction away from the nipple. No pain should be caused by this manipulation.

Abnormalities of Milk Secretion.—**Agalactia** means a marked diminution of mammary secretion.

Galactorrhœa means excessive mammary secretion. The supply of milk may be so abundant that it is constantly escaping from the nipples. The milk is generally thin and watery, and the health of the patient is impaired.

Treatment.—Apply a breast-binder; administer tonics, especially strychnia, belladonna, and arsenic; and saline laxatives. Potassium iodide, so often recommended, is, I think, worse than

useless. In the majority of cases lactation should be discontinued in the interest of both mother and babe.

Galactocele means the condition in which a lactiferous duct is completely blocked. It may be single or multiple, and affect one or both breasts. Sometimes the fluid part becomes absorbed, and the casein and fat become inspissated; or a cyst containing both fluids and solids may be formed. Diagnosis is sometimes difficult.

Treatment.—Make a free incision (not a puncture), clear out the contents, wash out, and apply pressure.

Treatment of Mammary Abscess.—As soon as the existence of a mammary abscess is suspected one should act promptly as follows: Clean the skin over the breast, get an assistant to give an anæsthetic, make a deep incision in the most dependent portion of the suspected abscess cavity, cutting in a line toward the nipple, make the incision long enough to admit the index finger, allow the pus to run out of the opening, pass the finger in and break down all the diseased tissues so as to destroy the walls of the various loculi of the honeycombed mass and form one cavity, scrape the wall of this cavity thoroughly with the tip of the finger or with a dull metallic curette, douche out the cavity and plug it fairly tight with iodoform gauze. Apply a breast-binder, not too tightly lest it prevent the secretion of milk in the sound breast. Remove the gauze daily, wash out, and reintroduce the gauze, as long as pus is found—generally from two to eight days. After this do not pack the cavity, but introduce a piece of gauze to keep the skin wound open, put a pad of absorbent or sheep's wool over this portion of the breast, and a breast-binder over all. Or the breast may be strapped and the strapping may be left on three or four days. This is not so comfortable as the bandage, and the removal of the strapping causes much pain. The breast may be supported by a figure-of-eight bandage. The pressure obliterates the cavity after you stop the plugging, and the wound is healed in from ten to twenty days after incising the abscess. If, when you make your incision, you find no pus, no harm will be done. In fact the resulting hæmorrhage will probably relieve tension and thus lessen the pain. Plugging in such a case will not be necessary, and suturing the wound is not advisable. The child should not nurse from the diseased breast so long as there is pus in it.

CHAPTER XX

THE EMOTIONAL ELEMENT IN THE PUERPERAL PERIOD, AND PUERPERAL INSANITY

EFFECTS OF EMOTIONAL DISTURBANCE

In the literature of thirty years ago we find many references to serious effects, puerperal fever, eclampsia, mania, etc., produced by emotional causes, such as worry, fright, anger, and the like. More recent developments showed conclusively that many of the results referred to were due to septicæmia. The innumerable discussions on sepsis and the various means adopted for its prevention have to a certain extent overshadowed the emotional element in the puerperium. Many go so far as to deny that simple emotions can cause serious rise of temperature. I believe, however, that very serious results may follow causes which are purely nervous in their origin.

Cases.—The following brief notes of a few among many cases which have come under my notice will illustrate some phases of the subject.

I. Mrs. A., aged twenty-three. Unusually healthy and free from hysteria. Second labor: normal until fifth day, when I found her condition quite serious. She was weeping, had a severe rigor, temperature 104°, pulse 125, milk secretion and lochia normal. On inquiry, found she had had a dispute with her nurse, who was acting badly in various ways, but especially in her treatment of the babe. The husband was sent for and the nurse at once discharged. In the evening, temperature and pulse were nearly normal, and on the following morning patient felt perfectly well.

II. January 22, 1889. M. H., unmarried. Labor normal. Temperature normal until tenth day, when she was visited by her mother, who had an interview with her alone. After the mother left, the matron found patient much excited and crying. Temperature 105°, pulse 120. Next morning temperature and pulse were normal, and remained so until she went out on the fifteenth day after labor.

III. Mrs. A., aged twenty-seven. IV para, healthy. Labor normal. Symptoms of slight septicæmia appeared on fourth day. On four different occasions during four weeks the temperature rose suddenly from emotional causes. There happened to be an entire absence of that sympathy which should exist between patient and nurse, and the two were continually at "cross purposes." The nurse was honest and conscientious, but singularly injudicious, and acted in such a way as to be a continuous source of irritation to her patient. On the twelfth day an accident happened to the babe, which much alarmed the mother. She became greatly excited, and I was sent for but did not arrive until two hours had expired. In the meantime the nurse was much distressed and went repeatedly to the window to look for me, and finally became as much excited as her patient, and wondered if the "doctor would never come." On my arrival I found the patient in a serious condition. She had a rigor, temperature 104.5°, pulse 120. There appeared to be in this patient a combination of septicæmia and emotional fever. She was confined to bed six weeks, but made a perfect recovery.

Conclusions.—It is, of course, difficult to arrive at definite conclusions with mathematical exactness, but I think there can be no doubt in Cases I and II that the rise of temperature and accompanying symptoms were caused entirely by emotional reactions. I think that an emotional explosion may cause a rise of temperature to the extent of seven degrees or more within a short time—certainly less than an hour, perhaps a few minutes.

Case III suggests the question, May emotional disturbance during the puerperal period produce serious effects and even endanger life? I believe that it may. In this case I thought the dangers to the patient were vastly increased by purely emotional causes, due principally to the want of tact of the nurse. It seems to me that any one who believes that a nervous cause may produce an elevation of temperature to the extent of six or eight degrees, can scarcely refuse to assent to the opinion that in many a serious case, when life is in danger, such nervous disturbance may turn the balance in the wrong direction. It is generally admitted that mental emotions play an important part in the causation of eclampsia and puerperal mania.

I sometimes fear that certain evils have arisen out of our modern methods of laboratory and hospital teaching as compared with the old-fashioned apprentice system. It appears to me that there is at the present time considerable danger that we are cultivating science at the expense of art in our profession. I have noticed in

medical students, trained nurses, and resident physicians and surgeons in hospitals, a tendency to look upon the sick and wounded as mere machines, and not as fellow creatures made of flesh and blood, and endowed with nervous organizations which are capable of unlimited suffering. I have seen many acts of positive cruelty on the part of those who appear to aim at treating the diseases and injuries, and not the patients.

If it is granted that the emotional element in the puerperal state is a powerful factor for good or evil, we must of necessity agree that it is important that we should ever endeavor to treat the peculiarities and idiosyncrasies of our patients, as well as the serious ailments and emergencies which may arise. We should always strive to guard against undue excitement from any cause. Much depends upon the manner and methods of the obstetrician. He should avoid what may be called "fussiness," but at the same time be ever on the alert. He should be quiet and kind without being weak and irresolute. In the lying-in chamber he is watching what should be a physiological process in one who is fulfilling the noblest function with which God has endowed her. He should, so far as possible, sink self into oblivion and think only of the interests of her whom he is called to serve. He should have his obstetrical satchel well equipped; he should be armed with a supreme knowledge of the best definite method of treating all emergencies; but he should keep his satchel and his knowledge in the background until they are actually required. He should use all the tact with which he is endowed, and at the same time exhibit unlimited firmness concealed under a kind and gentle manner. He should make all the surroundings for his patient as cheerful as possible, while enjoining perfect rest and quiet. He should strive to imbue nurses and immediate friends with the ideas herein expressed, and if possible keep all curious visitors and gossiping neighbors out of the house.

Possibly I may attach too much importance to what may be considered small matters; but it has appeared to me that in the practice of our art nothing can be deemed small. The success of the physician or surgeon depends on the strictest observance of things great and small, down to the most minute details. The most successful in our noble sphere of alleviating the ailments of our suffering fellow creatures have at all times been acutely observant, exceedingly watchful, and ever kind and gentle. In the practice

of obstetrics we should be second to none in the rigid and careful observance of all the rules, whether manifestly great or seemingly insignificant, which are likely to conduce to the welfare of our patients.

PUERPERAL INSANITY

Insanity of pregnancy, or of the puerperal period, or of lactation, does not differ in symptoms from ordinary insanity. The symptoms most commonly appear within six or seven weeks after labor, but frequently near the end of lactation and occasionally during pregnancy. The prodromal stage is generally short and hallucinations soon appear. Constipation is frequently very marked.

Melancholia is the most serious form and is frequently incurable. One may hope, however, for a cure in the majority of cases in about nine or ten months. One may look for recovery from mania in about six or seven months, but sometimes the mania is incurable. In monomania, or hysterical insanity or transitory frenzy, rapid recovery generally takes place.

Treatment.—When septic infection is present it should receive appropriate treatment; otherwise, the most important considerations are quiet, rest, watchful care, and nourishing diet. Much depends on the tact and judgment of the nurses or the friends in charge. The patient should never be left alone. A "transitory frenzy" in the shape of aversion to her babe may suddenly appear. In such a case the child's life is endangered. A suicidal tendency often develops. The patient often takes a strong dislike to all those she loved best during her sane moments. She sometimes takes a sudden dislike to a nurse she formerly liked. Under such circumstances one whom she now dislikes should keep out of her sight, though it be her husband, mother, or sister. When she refuses to take food force must be used. One of the most common symptoms is sleeplessness. For the treatment of this the most suitable hypnotics are hydrobromate of hyoscine, chloral hydrate, trional, sulphonal, and chloralamide.

The most important question for consideration comes up in connection with the advisability of sending the patient to an asylum for the insane. The relatives generally object to this. Many physicians also object on account of the after-effect on the patient. Most of our asylum physicians tell us that it is greatly

in the interest of all such patients to send them at once to asylums. When the patient refuses to take food, or when she turns against her nurse or nurses, or when she shows any homicidal or suicidal tendency, she should certainly be sent to an asylum as soon as possible. In mild cases most physicians will probably prefer to keep the patients at their own homes. This always means some risk, which should be fully explained to the friends.

CHAPTER XXI

LISTERISM AND OBSTETRICS

WITHOUT discussing in detail the exact meaning of the word Listerism, we shall suppose that it includes the principles and practice of modern aseptic and antiseptic medicine in all its departments, although the term antiseptic surgery is probably the one most commonly used. Frederick Treves, in his paper on The Progress of Surgery (The Practitioner), speaks as follows about Lister and his work:

"The great feature in Victorian surgery has, it is needless to say, been the introduction of the antiseptic method, and the great name which stands out above all others in the array of Victorian surgeons is the name of Lister.

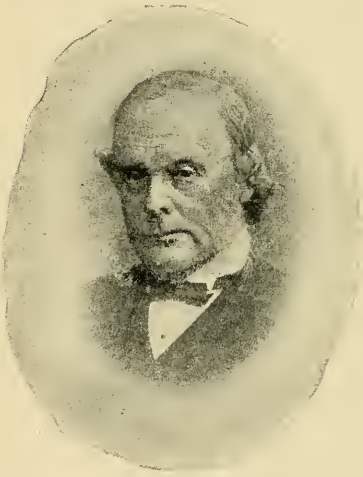


FIG. 152.—LORD LISTER.

"Lister created anew the ancient art of healing; he made a reality of the hope which had for all time sustained the surgeon's endeavors; he removed the impenetrable cloud which had stood for centuries between great principles and successful practice, and he rendered possible a treatment which had hitherto been but the vision of the dreamer. The nature of his discovery — like that of most great movements—was splendid in its simplicity and magnificent in its littleness. To the surgeon's craft it was but 'the one thing needful.' With it came the promise of a wonderful future, without it was the hopelessness of an impotent past. It might well have been in Browning's mind when he wrote—

"Oh! the little more and how much it is!
And the little less and what worlds away!"

Semmelweiss, Fordyce Barker, and Lister are three men whose names are inseparably connected with the great advances in midwifery during the last fifty years. Semmelweiss made a great discovery which the world did not properly appreciate during his lifetime. Barker made many improvements in the art of midwifery, which obstetricians recognized; but during his later years hugged a mistaken theory as to the nature of puerperal fever long after it had been exploded. Lister made the greatest discovery of last century, which, fortunately, the world fully appreciates.

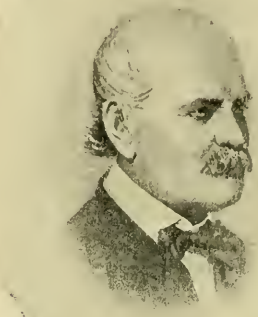


Fig. 153.—Semmelweiss.

Semmelweiss, in 1847, clearly and positively enunciated the view that puerperal fever was caused by the introduction of putrescent substances deposited in or about the genital tract of the parturient woman. He thought that such noxious substances were in reality decomposed animal matter, and also considered it possible that such offending material might be developed in the body of the patient (autogenetic). These views were adopted by a limited number, and from the year 1848 antiseptics have been used to a greater or lesser extent. Fordyce Barker commenced the use of antiseptics, including antiseptic vaginal douches, about the year 1854. In addition to the use of antiseptics he practised the strictest cleanliness, and in his teaching urged the importance of the same.

Lister, for years before he discovered the relationship between microbes and bad results in wound-infection, recognized the evil of putrefaction in surgery and endeavored to counteract it by cleanliness and the use of deodorant lotions. Up to this time he had advanced as far as Semmelweiss and Barker, but no farther. Fortunately, however, he did not stop here, but went on with his good work, and applied his knowledge of Pasteurism to surgery. His grand discovery stimulated surgeons and obstetricians in all

parts of the world, and caused them to make special efforts to avoid septicæmia.

Listerism has completely revolutionized our views and our methods in obstetrics. The idea that puerperal fever is a specific disease, like scarlet fever, is replaced by the opinion that it is a preventable disease produced by microbes which come from without. Auto-genetic puerperal fever, as it was formerly understood, is not now recognized. Our former theories as to varied forms of inflammation occurring during the puerperal period are changed and simplified, because we have accepted Lister's views as to the causes of surgical diseases.

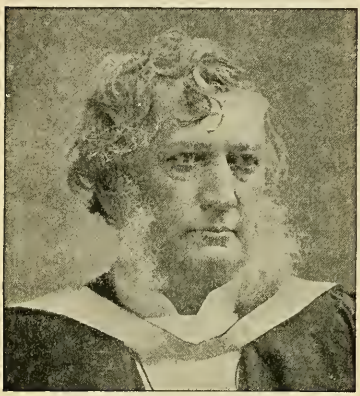


Fig. 154.—Fordyce Barker.

About the year 1872 obstetricians commenced to use Listerian methods, especially in large maternity hospitals. The new ideas and the new methods spread rapidly from hospital to hospital in Germany, France, Great Britain, America, and other countries. Rigid antiseptic methods were adopted, with marvelous changes in the mortality rates.

The wonderful reduction in mortality rates does not, however, tell the whole story. It tells us that many thousands of lives have been saved during the last thirty years through the application of Listerian methods; but it does not tell us how many other thousands have been relieved from the ill effects of septic infection which kills not, but cripples sadly. It is very unsatisfactory, in this connection, to find that the general results in private practice have not kept pace with those in lying-in hospitals. The annual reports of the Registrar-General of Great Britain show that the death-rates from childbirth have not appreciably diminished in England and Wales. In the United States and Canada the mortality from puerperal septicæmia has probably diminished during the last twenty years, but it is still very high.

PUERPERAL FEVER OR PUERPERAL SEPTIC INFECTION

Puerperal fever is a disease resulting from infection during labor, or the puerperium, by certain micro-organisms. It is an ordinary surgical toxæmia (as the term is now generally known), caused by the absorption of septic matters in the wounds of the utero-genital canal produced during parturition. It may be called puerperal infection, puerperal septic infection, puerperal septicæmia, puerperal sepsis, or childbed fever, a term so commonly used by the laity thirty years ago. No one of these terms, however, is correct in every sense.

The term puerperal fever, or febris puerperarium, was first used by Willis in 1676, and was in general use in Great Britain and America during the first three-quarters of the nineteenth century. When through the work of Semmelweiss, Pasteur, Lister, and others we began to acquire the new ideas as to its origin, the fitness of the term, puerperal fever, was called in question. The late Fordyce Barker, of New York, believed that puerperal fever was a specific disease, as definite in its nature as erysipelas, scarlet fever, or typhoid fever. Listerism, however, soon demonstrated the incorrectness of this contention, and the new term, puerperal septicæmia, was largely used.

Algernon Temple was one of the first in Canada to deny the specific entity of puerperal fever, and agreed with Garrigues that the term puerperal fever should be dropped and puerperal infection should be substituted.

Septicæmia is not a fortunate term, because etymologically it means a condition in which septic matter circulates in the blood throughout the whole body, and can not therefore properly include those numerous manifestations of sepsis which are distinctly local in character. This is rather unfortunate, because, as has been pointed out by Garrigues, it is an improvement in so far as it reminds us of the identity of puerperal infection with wound infection.

While speaking on this subject I shall not frequently use the term puerperal fever, but, instead, puerperal infection. The word infection is not exactly suitable, inasmuch as it is the cause of the condition we are considering, not the condition itself. Nor is it exactly correct, because, with the meaning generally attached to it in connection with this subject, it does not include all puerperal infections.

NATURE OF PUERPERAL INFECTION

It is an infection caused by the absorption of septic matter introduced from without. The doctor may introduce the poisonous germs at any step of labor on his finger-tips or on his instruments. The nurse may do the mischief while assisting the doctor during labor or, more frequently, after labor. Twenty-five or thirty years ago childbed fever was said to be caused by a cold. I have often heard this story. The patient was doing well until the third or fourth day, when an open window caused a draught which struck her and produced a chill. After that she went on from bad to worse until death ensued in a few days. We know now what that chill meant. It was a well-pronounced symptom of a dreadful but preventable disease—acute septicæmia—which has in the past, in a relentless way, claimed so many victims. One meets nothing in his professional experience more inexpressibly sad than a death from septicæmia. The bright and happy girl of yesterday becomes a bride to-day. In due course there are indications that she will soon become a mother. Her friends take an unusual interest in her welfare. Many years ago Oliver Wendell Holmes wrote as follows:

"The woman about to become a mother, or with her new-born infant upon her bosom, should be the object of trembling care and sympathy wherever she bears her tender burden or stretches her aching limbs. The very outcast of the streets has pity upon her sister in degradation when the seal of promised maternity is impressed upon her. The remorseless vengeance of the law brought down upon its victim by a machinery as sure as destiny is arrested in its fall at a word which reveals her transient claim for mercy. The solemn prayer of the liturgy singles out her sorrows from the multiplied trials of life, to plead for her in the hour of peril. God forbid that any member of the profession to which she trusts her life, doubly precious at that eventful period, should hazard it negligently, unadvisedly, or selfishly."

The bride to whom I have referred, with the help of loving friends, makes preparation for the babe that is to come. With her maternal instincts developed to the highest point she looks at the little shirts, the little petticoats, the little dresses; she thinks and dreams of her unborn child; she wonders if it will be marked, and hopes it will be "all right." At the proper time the nurse and doctor are summoned. She goes through the terrible ordeal of

labor. She hears with joy the first cry of her baby. In a short time she clasps him to her breast—thankful and happy. Anxious friends ask many questions. The accoucheur replies with much satisfaction, mother and child both doing well. All goes well, or *apparently* well, for three or four days. Then a cloud arises, the dread chill comes, a terrible poison fills the blood, and notwithstanding the efforts of the physician that happy young mother becomes cold in death. Loving friends are stunned and agonized, and an innocent motherless babe has lost its best friend. The tragedy is sad enough in all respects; but, from a professional point of view, the worst feature is that death should not have occurred—it should have been prevented.

Infection may occur, however, in spite of precautions of doctor and nurse. The dangers are so many, and so little (apparently) may sometimes produce serious results, that the most careful among us can never feel sure about the safety of the patient until a certain time has elapsed. Neither the man nor the institution has yet been discovered that sees not puerperal infection. Let us be rigid in our examination of ourselves when we have a patient suffering from any form of puerperal infection, and at the same time charitable in judging of others under similar circumstances.

HOW DOES THE INFECTION TAKE PLACE?

Certain poisonous matters are introduced from without and are absorbed by the open-mouthed blood-vessels and lymphatics which exist in the wounds of the perinæum, vulva, vagina, cervix, or the interior of the uterus (especially at the placental site). The result may be simply a putrefactive decomposition, or a mild septic infection with perhaps local purulent collections, or severe general systemic infection (acute septicæmia which causes death in from two to five days).

In mentioning the sites of absorption the perinæum is named first, because I think that in a majority of cases of puerperal fever the infection occurs through the tears of the perinæum or pelvic floor. John Caven had this point in view for some years, and in three consecutive cases found evidence post mortem to convince him that the torn perinæum was the site of absorption.

It is hard, of course, to form a very definite opinion, but I think that in most cases of severe or acute septicæmia the poison is

absorbed in the tears of the perinæum or vulva; in those of mild septicæmia or mixed infection the poison is absorbed in the tears of the vagina or cervix; in cases of sapræmia the poison is absorbed within the uterine cavity. It may be asserted, however, that all sorts of germs may be, and are actually, absorbed in wounds in any or all of these structures.

BACTERIOLOGY

We have learned much about bacteriology in recent years and we hope to learn more in the near future.

We know that puerperal infection is produced by micro-organisms generally, if not always, introduced from without. We know which are the most common and which are the most virulent of these organisms. We know that certain organisms are very virulent at times and comparatively innocent in other cases. We know that we have sometimes two or more kinds of organisms in connection with certain forms of sepsis—i. e., mixed infection. We know that we can, in a large proportion of cases, if not in all, by certain aseptic and antiseptic methods, prevent the ingress of such organisms and thereby avoid septic conditions. We know that we have certain vital protecting forces in our body which fight these pathogenic germs that come in from without. We know that these vital forces within our body are frequently victorious, and we know they are sometimes vanquished.

We do not know whether these pyogenic organisms are themselves the septic matter, or whether they carry it, or whether in certain cases they are simply "accidental concomitants." We do not know why certain organisms are more virulent than others. We do not know why in some cases the vital forces in our body are victorious, while under similar circumstances at other times they are vanquished. We do not know why certain organisms are extremely virulent in some instances and comparatively innocent in others. We do not know what portion of the evil work accomplished is done by the different organisms which we find in mixed infections.

Some tell us that there are, under ordinary circumstances, pyogenic organisms in both the uterine cavity and the vagina; others say there are none in either; others say there are cocci, including the streptococci, which we fear most, in the vagina, but they are not pyogenic but rather saprophytic in character.

The subject will here be simplified as far as possible, and reference will be made only to facts related by bacteriologists which coincide with those acquired by clinical observation.

The specific microbes which produce puerperal infection are streptococci, staphylococci, colon bacilli, gonococci, and saprophytic bacteria.

Other microbes occasionally found are bacillus diphtheriæ, diplococcus pneumoniæ, the gas bacillus of Welch, and the bacillus sepsis.

In the first place, it may be well to say a few words about the ordinary condition of the utero-vaginal canal during pregnancy and the natural barriers which prevent the ingress of the outside organisms. No special reference will be made in this connection to the gonococcus, which is different from all other organisms in various ways. I think it never produces acute septicæmia, but as it generally produces some serious effect, especially after labor, it will be considered in another chapter.

Uterus.—Normally there are no pathogenic organisms present in the uterine cavity during pregnancy. This is positively stated by such a large number of careful observers, and at the same time is in such thorough accord with clinical observations, that it may be accepted as a fact.

Cervix.—The plug of mucus found in the cervix uteri of the pregnant woman is a peculiar and important structure and is called by some the operculum. The plug is practically sterile. There has been a little confusion as to this subject through differences of detail in the methods of examination, but it is generally admitted that the upper part of the plug is absolutely sterile and fills the cavity so completely that it prevents the passage of germs.

Vagina.—The vagina is practically sterile, and not only is it sterile, but the vaginal secretion itself will destroy certain germs, especially the staphylococci. That is to say, if these germs are introduced within the vagina they will be destroyed within a limited time. This quality of the secretion is due to the presence of what is called the vaginal bacillus, which keeps the secretion acid.

Vulva.—There is a different condition in the neighborhood of the vulva. In a large proportion of cases pyogenic bacteria exist at the vulvar orifice, and these organisms, situated thus superficially, are dangerous during labor and the puerperium. A very

important difference in the condition is found after labor. Within a short time the acid secretion of the vagina becomes alkaline from the destruction of the bacilli vaginæ by the lochia. Any septic organisms may, under the changed conditions, cause much mischief, especially during the first three days after labor. If everything has gone on favorably for three or four days the wounds will be healthy and as a consequence will be covered with granulations. These granulations, as before mentioned, are a great barrier to absorption, and therefore if there is no infection before the formation of the granulations the danger of serious or acute septicæmia thereafter is almost nil.

VARIETIES OF PUERPERAL INFECTION

It is difficult to name specifically the different varieties of puerperal infection. It seems convenient to speak first of two varieties —that is, sapræmia, or putrid intoxication, and septicæmia, or infection by pyogenic germs. Unfortunately the term sapræmia, which was first used by Matthews Duncan, has been applied to so many forms of infection that much confusion has arisen.

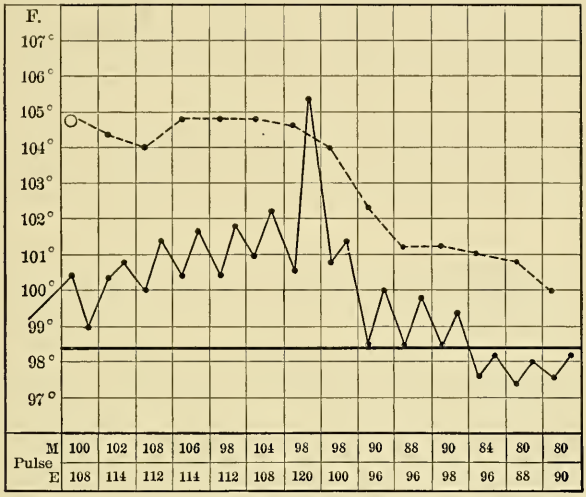
Smyly, Jellett and Lyle, of the Rotunda, believe that organisms which were at first saprophytic and thus able to live upon dead matter only, may under certain conditions become parasitic and thus able to exist on living tissues. According to their views, therefore, sapræmia may be both saprophytic and parasitic (or septic). This is, I think, going beyond what Duncan intended.

In sepsis we may have only one form or one kind of pyogenic germ, or we may have two or more kinds of such germs. In certain cases the germs are less virulent and cause results less serious; in other cases the germs are very virulent and cause death rapidly; in other cases there is severe poisoning, the symptoms of which may become, to a certain extent, chronic; and under such circumstances metastatic abscesses may occur.

In considering the various forms of septic infection that may arise it is advisable to use a classification which is simple in character from a clinical standpoint; but while the clinical aspects should be kept in view, it should be founded on a bacteriological basis. Puerperal infection includes the following: (1) sapræmia, (2) mild septicæmia, (3) mixed infection, (4) acute septicæmia, and (5) pyæmia.

Sapræmia.—Sapræmia is a condition caused by the absorption of the products of decomposition. The bacteria concerned in the process are called saprophytic organisms, which live on dead matter, such as blood clots, portions of placenta, or membranes.

Mild Septicæmia.—Septicæmia of any sort or degree is a diseased condition produced by the absorption of the products of



Pulse														
M	100	102	108	106	98	104	98	98	90	88	90	84	80	80
E	108	114	112	114	112	108	120	100	96	96	98	96	88	90

FIG. 155.—ABNORMAL INVOLUTION, TEMPERATURE AND PULSE RATE, MILD SEPTICÆMIA, WITH SUBINVOLUTION.

Temperature rose to 105.4 after curettement on seventh day. The curettement was probably unnecessary and harmful.

pathogenic bacteria. It is convenient for clinical purposes to speak of a mild septicæmia as opposed to a severe or acute septicæmia.

The clinical differences between the two are well marked; the bacteriological differences between the two are not so well marked so far as we understand the subject at present.

Mixed Infection.—Mixed infection is produced by the ingress of two or more varieties of pathogenic germs. We might, for instance, find in the system streptococci with a few staphylococci and colon bacilli. This would be, in a sense, mixed infection, but it might be that the streptococci did all the damage, while the staphylococci and colon bacilli had little or no effect. From a clinical standpoint this should not be considered a mixed infection.

In another case a patient might be ill for some time with perhaps peritonitis, produced chiefly or altogether by streptococci, metastatic abscesses in various organs produced by staphylococci, and perhaps the colon bacilli might have a certain effect on each of these separate processes or conditions. This would be from a clinical point of view a case of mixed infection.

Acute Septicæmia.—Acute septicæmia (or acutest septicæmia of Garrigues) is that virulent form of septic poisoning which causes death in from two to five days. In this variety of sepsis the germs are so powerful for evil that they produce their fatal effects in a short time. The nerve centers are completely overpowered, and death comes so rapidly that there is not sufficient time for the development of the ordinary gross pathological conditions which are found after death from the milder infections.

Pyæmia.—Pyæmia is a form of toxæmia in which living bacteria are carried in the blood currents to distant tissues, where they grow, multiply, and produce abscesses. It is probable that these bacteria are first lodged in clots and gain entrance to the general circulation as the clots break down. Pyæmia has never been considered a scientific term, and is not at all, as its etymology implies, a condition of pus in the blood. It has been retained chiefly on account of its clinical value as referring to a disease with formation of abscesses in various parts of the body. (In other words, it may be considered a subacute or chronic septicæmia with the formation of the abscesses before referred to.) The germs which produce the infection are, in the majority of instances, those which produce acute or severe septicæmia.

There is another classification of less importance: (1) Heterogenetic infection, when the poison is introduced from without. (2) Autogenetic infection, when the poison is generated within the body.

There has been a great deal of discussion on this subject in the past. The importance of the autogenetic infection was at one time greatly exaggerated. Many authors spoke very strongly on the subject. Chalmers Cameron considered that the doctrine of auto-infection, as commonly expounded, could do nothing but harm and therefore should be absolutely condemned.

Obstetricians should in practice consider that in all cases the poison comes from without, although it may be admitted that auto-infection does occasionally occur.

PATHOLOGY

After a consideration of the bacteriology of septic infection one can understand, to a certain extent at least, the reasons for the great variety of lesions which are produced in the body by the microbes or their products. The following are the principal types of pathological conditions which are found:

Poisoning.—*The profound poisoning* which overpowers the nerve centers causes death so quickly that there are no gross lesions. There are, however, as pointed out by Garrigues, traces of lymphangitis or phlebitis, swelling of the connective tissue, and a little bloody fluid in the different cavities. The abdominal organs are large, soft, and friable, the microscope showing their cells to be in the condition called cloudy swelling; the blood is thin, dark, and only slightly coagulable.

Vulvitis and Vaginitis.—In connection with inflammation of the vulva and vagina, one of the most important conditions is the so-called diphtheritic ulcer, which may be found on the surface of the tears about the vulva and in the vagina. In almost all cases, if not in all, such an ulcer has nothing in common with diphtheria except its external appearance. Puerperal vaginitis may therefore occur in two forms: either inflammation where a certain portion of the vagina is covered by this pseudo-diphtheritic membrane, or a general inflammation when the mucosa becomes thick, soft, red, and covered with pus (Williams).

Endometritis.—The endometrium is, in a large proportion of cases (some say in the majority), an important seat of the puerperal infection. The septic endometritis thus induced varies greatly according to the character of the organisms and the varying virulence of such organisms. When produced by virulent streptococci or staphylococci the changes are comparatively slight, as before indicated. On the other hand, when produced by putrefactive organisms, and perhaps by the colon bacilli, the local lesions are much more apparent. The infection may be limited to the placental site or it may be spread over the entire mucosa. When confined to the placental site the organisms usually pass into the thrombi; when extending over the whole inner surface of the uterus the local effects are much more marked. A great deal of necrotic material is produced, dirty and yellowish green in color. Ulcerated surfaces coated with fibrin ("diphtheritic

patches") are sometimes found. In cases of infection due to the invasion of virulent streptococci, or staphylococci, there is usually little or no odor from the lochia; but in cases of invasion by saprophytic organisms or the colon bacilli there is a very offensive odor from the discharges.

Metritis.—Various forms of metritis are likely to exist in connection with the different forms of infection. There may be a simple inflammatory condition, in which the walls are thickened, soft and friable, or a more serious form called putrescent metritis. In the latter form the uterus is large, although the walls may be thin. There is considerable destruction of tissue, and irregular cavities are found filled with a dark-colored pulp or with purulent fluid.

Parametritis is inflammation of tissues in the vicinity of the uterus. It is usually caused by the passage of the organisms from the uterus, especially from a lacerated cervix, through the lymphatics to the peri-uterine connective tissue. According to Whitridge Williams, the first effect is a marked inflammatory œdema with very little or no suppuration. In mild cases the process is stopped here; in more severe cases the infection spreads to the surrounding connective tissue and causes the formation of abscesses.

Salpingitis.—Inflammation of the Fallopian tubes is quite common, and is generally due to an extension of the process from the uterine cavity, but sometimes is probably due to infection through the lymphatics.

Oöphoritis.—Less commonly we have septic inflammation of the ovaries, probably due in most cases to infection through the lymphatics. We are told, however, that in a certain number of cases it may be due to direct infection of a ruptured follicle by means of the peritonitic exudation.

Peritonitis.—Peritonitis is such a common affection in puerperal fever that at one time the two terms, puerperal fever and puerperal peritonitis, were thought to be synonymous. The inflammation may be local—that is, confined to the pelvis; or general—that is, extending over the whole abdomen. It is generally due to infection by the organisms that pass from the interior of the uterus through the lymphatics to its peritoneal surface. It may rarely be due to infection by pus from the Fallopian tubes or by rupture of parametric or ovarian abscesses. The inflammation

may be plastic or purulent. Fluid is found in the peritoneal cavity which may be serous or purulent, which often resembles milk.

Pyæmia.—This is probably due in most cases to the infection of the thrombi at the placental site, followed by inflammatory changes in the veins. When the thrombi break down small particles are carried to various parts of the body, giving rise to the abscesses before referred to. Such abscesses may be found in all the internal organs and in synovial cavities.

Phlegmasia Alba Dolens.—This is a peculiar form of infection, in which there is an extension of the infective process to the tissues surrounding large blood-vessels, generally of the lower extremities, but sometimes those of the upper extremities, through the lymphatics. Thromboses then occur in these large vessels due to the lymphatic involvement.

SYMPTOMS OF PUERPERAL INFECTION

One can easily understand the vast importance of the question of diagnosis of puerperal infection. An early recognition of the symptoms will enable the accoucheur to treat promptly, and in a large proportion of cases successfully, this dread disease. The descriptions of the symptoms of septic infection given in the majority of our text-books are unsatisfactory and to some extent misleading.

The following paragraph from one of the best treatises on obstetrics may be taken as an illustration:

"In the cases of septic endometritis everything goes smoothly for the first three or four days of the puerperium, when our patient, who thus far has done perfectly well, suddenly experiences more or less malaise, possibly has a headache, and toward the end of the third or fourth day a chill, after which the temperature rises to 103° or more. Generally the chill occurs but once, while the temperature remains constantly elevated."

This is wrong; things never go "smoothly for the first three or four days of the puerperium" in a case of infection.

On the other hand, we have had correct descriptions from authors on the Continent. Ferré some years ago described very clearly what he called the premonitory symptoms.

Slight elevation of temperature once or twice daily, and usually in the evening; pulse 80 or more, especially in the morning, when

the temperature is not yet raised; relative or absolute insomnia; headache, at first intermittent and slight; vague impressions of cold, not usually a distinct rigor.

The following quotation from a very able but modest little pamphlet entitled "Clinical Observations on Two Thousand Obstetric Cases," published in 1898 by Porter Mathew, of London, formerly Resident Obstetric Officer at St. Mary's Hospital and Queen Charlotte Hospital, is, I think, in all respects correct.

Fig. 156.—Louis Pasteur.

"Any one who reads or hears of fatal cases of septicæmia must be very much struck with the fact that the account of the case is invariably that progress was perfectly satisfactory until the third or fourth day, or later, as the case may be, when the patient developed a rigor or high temperature, and then treatment was started but too often without avail. This would lead the unwary to imagine that the onset, like many of the specific fevers, was of a very sudden, almost fulminating, character. It is a curious fact, however, that though I have looked through twelve thousand puerperal temperature charts I can not find a single instance of perfectly satisfactory progress followed by septicæmia. There are always present premonitory signs and symptoms of mischief brewing before the rigor, which by so many is looked upon as the beginning of the illness. These symptoms are loss of appetite, insomnia, a feeling of fatigue or lassitude, low spirits with tendency to tears, perspiration, and frontal headache. The signs are a progressive, step-like, or irregular rise of temperature, with marked morning remission and evening exacerbation, a gradual rise in pulse rate with marked remission at night, with or without tenderness, especially local tenderness of the uterus, and decomposition of the lochia in the uterus. Some of these signs or symptoms, usually both, were

invariably present, but in a few cases the only apparent abnormal condition was the temperature, especially the gradual increasing rise at night. Evidently, then, if the development of septicæmia is preventable it is to these early symptoms we must look for warning, and if any treatment be of avail its success will be the more enhanced the earlier the recognition of these premonitory signs."

We have, then, two sets of symptoms: the early or premonitory, on the one hand, and the ordinary symptoms on the other. The directions as to watchful care of the patient during the early days of the normal puerperium may be repeated to some extent.

On the second day study the appearance of the patient carefully. Has she a happy, restful aspect of countenance, or has she a worried expression? Does she appear to be quiet and comfortable, or restless and uncomfortable? You make your inquiries from the patient. Has she felt well since you last saw her? She may say, "Yes, quite well." That will be satisfactory. She may say, "Yes, doctor, I feel pretty well, but I have a slight headache. I think it arises from the fact that I did not sleep very well. I think I couldn't sleep because the baby was troublesome and cried a good deal." This answer is very unsatisfactory. In it there are two of the most constant premonitory symptoms of infection: insomnia and headache. Continue inquiries with reference to both these features, and also as to whether she feels tired. Find out if she has any perspiration. With reference to the headache, find out where it is—that is to say, is it frontal?

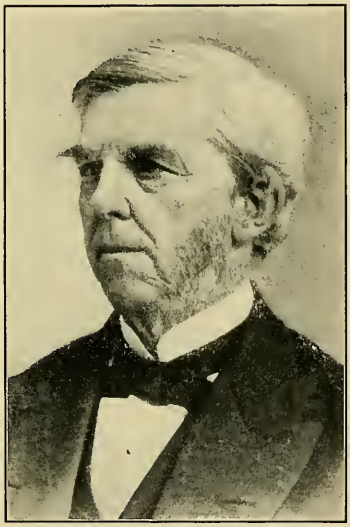
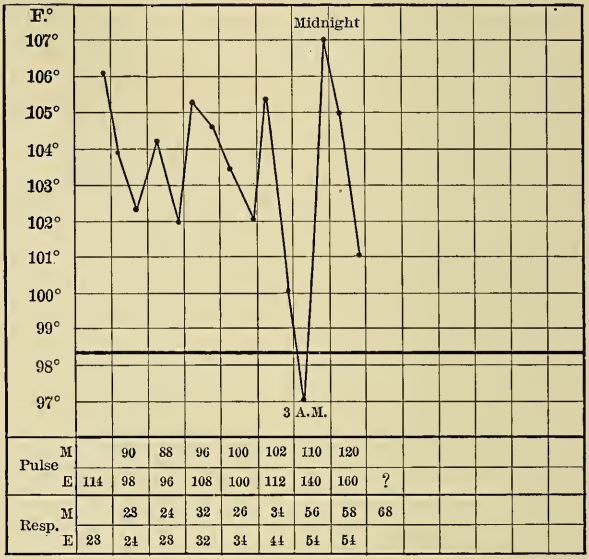


Fig. 157.—Oliver Wendell Holmes.

What is the pulse rate? Is it under or over 80? What is the temperature? This may be increased to a slight degree, of course, without evil results. A temperature of 100 would in the majority of cases not be so serious a symptom as insomnia with headache.

Then get all the information possible from the nurse as to all these points which you have already inquired about, and especially as to the quantity and quality of the lochia. Pursue



Pulse	M		90	88	96	100	102	110	120						
	E	114	98	96	108	100	112	140	160	?					
Resp.	M		28	24	32	26	34	56	58	68					
	E	23	24	23	32	34	44	54	54						

FIG. 158.—PATIENT ATTENDED BY A MIDWIFE; SEEN BY DR. WILLIAM BRITTON, FIVE DAYS AFTER LABOR; SEPTICÆMIA, PNEUMONIA.

Highest and lowest during each twenty-four hours. On the day before death temperature rose 10° between 3 A. M. and midnight. Died at 4 A. M. next day.

a similar method of investigation during the third, fourth, and fifth days.

In speaking of ordinary symptoms there is considerable difficulty in giving anything like a definite classification. In speaking of the pathological anatomy reference was made to the various conditions found in the different parts of the body. The symptoms will naturally vary according to the parts of the body infected. Lesions which are localized will naturally give rise to symptoms very different from those where the whole system is infected. Differences in the character or in the virulence or in the number of the infective organisms will also cause great variations in the symptoms.

ORDINARY SYMPTOMS

Smyly's admirable aphorisms are interesting and useful.

If a patient with a high temperature looks well, sleeps well, and says she is well, she is, at any rate, not septic.

If a patient with a high temperature looks very ill, sleeps very badly, and says she feels ill, she generally is very ill.

If a patient with a high temperature looks very ill, sleeps very badly, but says she is very well, she will probably die.

Rapid Pulse.—The pulse rate is the one symptom which is important above all others. It is, in a large proportion of cases, the most certain indicator of the condition of the system. For example, the pulse rate on the second day is 90, and steadily advances

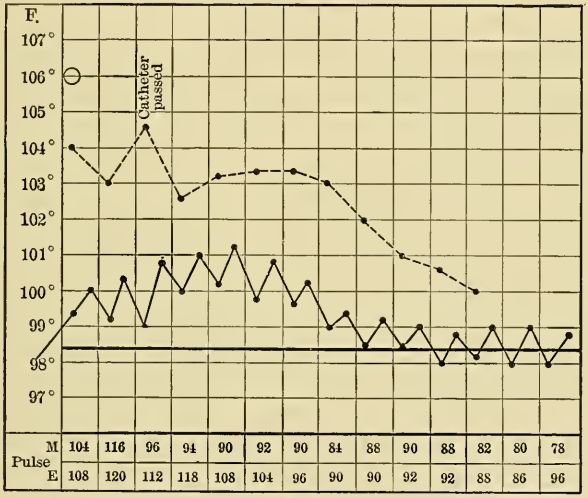


FIG. 159.—ABNORMAL INVOLUTION LINE.

Case went "queer" for a few days from unknown causes. Good recovery followed eliminative treatment.

until the fifth day, when it is 140. Without having any regard to other symptoms it may be stated that this patient will surely die.

Increased Temperature.—An abnormal temperature is also an important symptom, especially as it is likely to be one of the first to be observed. A very high temperature or a very low temperature is a serious sign; irregular fluctuations in the temperature indicate a serious condition, but it may happen that the temperature

at a very critical period is normal, as, for instance, when it is passing from an abnormally high to an abnormally low degree—that is, one may happen to take the temperature while it is crossing the normal line. As before indicated, there may be a slight rise of

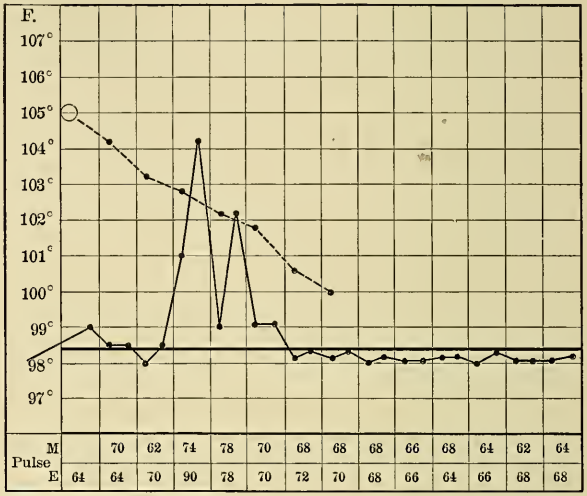


Fig. 160.—Slight Influenza; no Complications; Good Recovery.

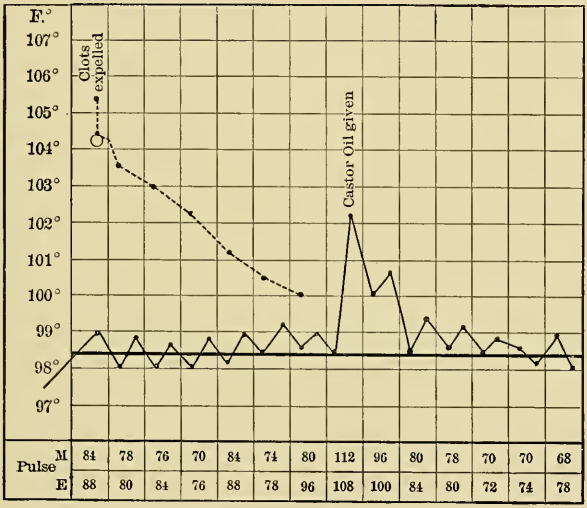
temperature, the so-called reactionary temperature, which may be considered physiological, at least not pathological. There may be also a rapid pulse, increased temperature from other causes some of which have been discussed, such as influenza, indigestion, general malaise, etc. It is hard to give a definite rule, but it may be stated in a general way that when the temperature rises to 101° or more and remains there for some time the patient is in a serious condition.

Rigor.—A rigor, or chill (so called), when due to sepsis, is a very serious symptom. The chill which the patient has very commonly immediately after delivery is not at all serious. There may be a very pronounced rigor in certain cases from very slight causes, especially emotional causes. However, any rigor occurring one or more days after delivery should be considered serious. It is well to take the more serious view, although one may at the same time have the slighter causes in his mind. In any case careful investigation should be made.

Pain and Tenderness.—Pain in and about the parturient canal is a common symptom. Pain and tenderness over the abdomen are also common symptoms. We are apt to find such pain and tenderness especially when there is general peritonitis. However, one may have general septic peritonitis with very little or absolutely no pain; and, unfortunately, under such circumstances the absence of the pain and tenderness is a very bad sign, and probably points to that terrible condition known as acutest septicæmia.

Low Delirium.—There is nothing special about the character of the low delirium, which is similar to that which we find in many, or all, diseases accompanied by high temperature and great debility.

Expression and Color of Face.—There is generally, or always, some change in the expression of the face and also in its color.



Pulse														
M	84	78	76	70	84	74	80	112	96	80	78	70	70	68
E	88	80	84	76	88	78	96	108	100	84	80	72	74	78

FIG. 161.—AFTER DELIVERY OF PLACENTA, FUNDUS ASCENDED. CLOTS EXPELLED, FUNDUS IMMEDIATELY DESCENDED.

Temperature rose on eighth day from acute indigestion. A dose of castor oil caused fall of temperature.

The countenance is anxious and sometimes the color is sallow. There is, in many cases of acute septicæmia, a peculiar expression which I can not describe, but which when once seen is generally remembered. The face is pinched and ghastly, with frequently a

bright red spot on each cheek and an unnaturally bright expression in the eyes. After a time the face is covered with cold drops of perspiration and the lips become blue.

Disorders of the Stomach and Intestinal Canal.—There is generally derangement of the stomach, as shown by loss of appetite and vomiting; also of the intestinal canal, as shown by diarrhœa. Vomiting of coffee-ground substances is an especially serious symptom.

Changes in the Lochia.—Sometimes the lochia become offensive. This indicates sapræmia, although the lochia may become slightly offensive simply by retention in the vagina. In other cases the lochia may be suppressed. This is generally an indication of sepsis. There is, however, a very serious septic condition without suppression of the lochia, and sometimes in such cases the lochia may not be in the least offensive.

Reference will now be made briefly to some of the varieties of infection which have special characteristics.

Sapræmia.—Rapid pulse and rise of temperature occur in from the second to fifth day after labor. The symptoms appear somewhat gradually, at the same time the lochia become offensive. With these signs we have the ordinary symptoms, before described, of headache, insomnia, and weariness. We do not consider this a very serious condition because we believe that we can cure it. One should, however, never forget that sapræmia may be followed by the more serious condition of septic infection.

Mild Sepsis.—The symptoms of mild sepsis include all those which were described as premonitory; and in addition many of those termed ordinary. Pain and tenderness are generally prominent symptoms and depend on the parts infected. In many cases the system is able to throw off the poison, in other cases localized inflammations occur, which may end in resolution or in suppuration. In such cases we have the ordinary symptoms associated with such inflammatory processes. The most common varieties of localized inflammation caused by mild sepsis are pelvic cellulitis and pelvic peritonitis.

Parametritis or Pelvic Cellulitis.—The physical signs of inflammation of the pelvic connective tissue generally appear about the fourth or fifth day, or two or three days after the commencement of the ordinary premonitory signs of sepsis, or about one day after the onset of the more serious symptoms. There is an effusion

of lymph nearly always confined to one side of the pelvis (generally the left side); this causes a swelling, which can easily be felt by vaginal examination, and which is frequently so large that it pushes the uterus toward the opposite side. When the swelling reaches the pelvic wall it follows the latter closely, while in peritonitis the fingers may be inserted between the swelling and the bones (Garrigues). When suppuration takes place we get what is commonly known as pelvic abscess. The lymph effusion may extend from the broad ligaments to the connective tissue about the psoas muscle, or beneath the parietal peritonæum, or along the round ligaments to the inguinal canal, or from the utero-sacral ligaments to the connective tissue about the rectum. Dakin says the effect of such spreading is sometimes confusing, especially when the cellulitis has disappeared from the pelvis, leaving masses of inflamed tissue in remote parts of the abdomen.

During the process of absorption of an ordinary inflammatory effusion in the broad ligament, the contraction, which usually occurs in resolving inflammatory deposits, causes the uterus to be drawn toward the side originally affected. Thus we are likely to find during the progress of the case the uterus at first pushed toward the right side of the pelvis, and after a time drawn close to the left side, or occasionally vice versa.

Pelvic Peritonitis.—The physical signs of localized inflammation of the pelvic peritonæum generally appear about one or two days later than those of pelvic cellulitis. This can be detected in those cases where the patient had both parametritis and peritonitis. The premonitory and actual symptoms of sepsis are generally well pronounced some days before the inflammatory products can be detected. These symptoms are to some extent similar to those due to parametritis, but in peritonitis, even when fairly well localized, the initial chill is more common and more protracted. This is followed by great pain and tenderness in the lower abdomen, with rapid pulse and high temperature. It is frequently hard to draw the line between general and local peritonitis, and for some days it may be impossible to decide in a particular case.

After a time (generally seven to twelve days after labor) the inflammatory exudate in the pelvis and lower abdomen may be detected by internal and external examination. The mass is not usually unilateral as in parametritis, and is situated behind in Douglas's pouch and not on one side of the uterus. The exudate

gradually appears to surround the uterus, causing a fixation of that organ similar to that which would be produced by "pouring plaster of Paris into the pelvic peritoneal cavity." The outer wall of the exudation is composed of agglutinated omentum, intestines, uterus, and appendages. The abdominal surface of the mass is uneven, and sometimes shows different degrees of resistance in different parts. As in pelvic cellulitis, so also in pelvic peritonitis, the inflammation may end in resolution, the hard exudation melting away, and it, together with the contained fluids, being absorbed. In other cases suppuration takes place, forming one or more abscesses. Such abscess, or abscesses, may open into hollow organs, or externally, as in the case of the abscesses due to cellulitis. After weeks or months of suffering with chills and fever, recovery may take place. Unfortunately, however, it too frequently happens that the woman becomes a chronic invalid, with more or less permanent lesions in the pelvis and lower abdomen.

Diffuse Peritonitis is generally associated with general systemic infection, although the symptoms of the former may largely predominate. The symptoms of diffuse peritonitis are similar to those of local peritonitis, but appear sooner and are more pronounced. The chills last longer and are more severe. The pains are extreme and extend over the whole abdomen. These pains may cease before death, or, as before mentioned, they may be absent altogether in very bad types of infection. The abdomen is distended, the breathing shallow, rapid, and diaphragmatic. The other symptoms are those which have been described in connection with general infection, and will again be referred to under the heading of Acute Sepsis.

Acute Sepsis.—In giving the symptoms of acute sepsis I shall closely follow Jellett. The symptoms appear from twenty-four to fifty hours, or even less, after infection. Frequently a severe rigor occurs early, during which the temperature rises to 104° or 106°. The pulse is exceedingly frequent, and is even out of proportion to the temperature. Rigors recur frequently, and during the intervals the patient is bathed in a profuse cold perspiration. The lochia and milk secretion are either not established or cease completely. The patient is sleepless and looks extremely ill; her face is pinched and often jaundiced. The angles of the mouth and face are drawn down and the eyes appear sunken into the head. Sometimes in the worst cases the patient may say that she feels

extremely well. This condition is called euphoria, and is due to the fact that the higher nerve centers are dulled by the poison which is circulating in the system. Frequently there is a diffuse septic peritonitis. The duration is from two to five days, or sometimes a week.

Pyæmia.—It is frequently stated, in connection with pyæmia, that the symptoms do not appear until the seventh to the twelfth day after delivery. I desire to repeat that I consider this wrong. The premonitory symptoms always appear within two or three days after delivery. The symptoms are really very much like those of acute sepsis, but the serious ones come on later and last much longer. In a few days after the onset of the serious symptoms metastatic abscesses form. These may occur in any part of the body, but they generally follow one of two definite courses. They are found in one class of cases in the superficial parts of the body, generally either in the joints or subcutaneously; they are found in the other class in the deeper organs, as the liver, lungs, spleen, brain, etc. As each new abscess is developed there is a recurrence of the rigors. The patient may gradually recover, but quite as frequently dies. Death from pyæmia may occur in several ways: from exhaustion due to long-continued suppuration, from septic pneumonia, peritonitis, endocarditis, or from abscesses forming in vital organs, such as the liver and brain.

TREATMENT OF PUERPERAL INFECTION

As soon as symptoms of septicæmia appear, two therapeutic procedures should be at once considered: catharsis and local treatment. Reference is here made especially to the early or premonitory symptoms. If, on the second, third, or fourth day, there are headache, sleeplessness, rapid pulse, slight elevation of temperature, and chilly feelings, or any one or more of these, the accoucheur should at once carry out the first mentioned therapeutic procedure.

Catharsis.—Give calomel, one-half to one grain every fifteen to thirty minutes, for four to six doses; follow with magnesium sulphate, saturated solution, two to six drams, every hour or two until the bowels are moved. If the bowels are not moved after three or four doses, administer an enema of soap suds, a pint to a quart, with a tablespoonful of turpentine. Aim at having four to

six watery evacuations in the twenty-four hours for several days if necessary, even twelve evacuations in the twenty-four hours will do no harm. Some people fear the danger of such active treatment. There may be some danger of causing extreme prostration, and one should, of course, guard against that. However, the danger in that respect is only slight. We find, from clinical experience, that the elimination of any poison from the body is not likely to produce weakness; it rather tends to keep up the strength of the resisting forces in the body. If the symptoms are only slight, such as headache, insomnia, and are relieved by the calomel and saline, stop the medication.

We may carry out this cathartic treatment with confidence, because, with the exception of certain cases of acute local or general peritonitis (in the early stages), benefit will always accrue. When we come to consider further the advisability of local treatment we cannot act with so much certainty. If the symptoms are due, for instance, to an ordinary influenza or a slight attack of indigestion, local treatment would be not simply useless but might do actual damage. We want always to avoid the "meddlesome" feature in our work. We cannot give an intra-uterine douche, or even a vaginal douche, without causing some constitutional effect, as shown by increased temperature and pulse rate. Therefore we should look upon such procedures as evils, to be avoided unless we adopt them to remove still greater evils which exist. Mann advises us to first make our diagnosis by bacteriological examinations according to the methods of Döderlein and Whitridge Williams. McIlwraith has done work on these lines in our General Hospital, and has shown that such examinations aid us to a limited extent in diagnosis, prognosis, and treatment.

Three difficulties in this connection present themselves. First, a great many have not the facilities for carrying out such investigations in private practice; second, streptococci and staphylococci are sometimes found in the puerperal uterus in normal cases; third, a certain amount of very valuable time may be lost while waiting for the results of such investigations. Virulent streptococci within the uterus generally travel somewhat rapidly along the lymphatics toward the peri-uterine tissues. Under such circumstances it would be unfortunate to lose twelve to twenty-four hours, during which time they might get beyond our reach, while, if we acted promptly, we might counteract their evil effects.

The following simple rules may be accepted:

1. In all cases when the lochia become offensive, treat locally.

2. When it is suspected that portions of placenta or membranes are retained and symptoms of sepsis appear, explore the interior of the uterus, remove débris if present, and wash out.

3. When in doubt as to the condition of the uterus when symptoms of sepsis appear, explore and wash out. If return flow is clear do not repeat.

Local Treatment.—I fear that, in a large proportion of cases, local treatment even during the last few years has been very imperfectly or improperly carried out. Take, for instance, the administration of intra-uterine douches. In the first place, a large number of practitioners do not know how to administer an intra-uterine douche; in the second place, the intra-uterine douche, no matter how well it may be administered, frequently if not generally does little or no good. In sapræmia it only washes away some shreds and clots, while it leaves putrid débris and adherent clots behind. It may be, however, that in a very small proportion of cases it cures mild sapræmia.

Proper Method of Local Treatment for Uterine Infection.—Let an assistant administer a general anæsthetic. Adopt all the antiseptic precautions that should be employed for an abdominal section or any other surgical operation. After having made yourself thoroughly clean, wash the vulva and vagina as before described, then introduce the hand or half hand into the vagina and one or two fingers thence into the uterus. If portions of the placenta or membranes or débris of any sort are found, scrape thoroughly and remove. There is no instrument so good for this purpose as the intelligent finger-tip.

After removing the débris, wash out with hot water (110°–118° F.) that has been boiled, or with a weak antiseptic solution, pack the uterine cavity somewhat tightly with iodoform gauze and the vagina loosely with the same; leave the gauze in position twenty to thirty hours.

The weak antiseptic solution which has been mentioned is really of small consequence. The sterilized water will wash out all the débris which has been loosened with the fingers. If antiseptic solutions which are strong enough to kill pathogenic germs are used, they will produce a certain amount of necrosed tissue which will simply form a culture medium for the growth of

microbes, while if they are not strong enough to kill germs they are no better than sterilized water.

Some use the blunt curette. This is not so safe nor effective as the finger-tip. Others use the sharp curette. This is not safe, because it is likely to open vessels which may absorb more poison, or it may destroy that so-called reaction zone which is said to be formed in the uterine tissue during the inflammatory process, which tends to resist the invasion of germs. If nothing has been found in the uterus and the discharges are not offensive, but still the patient becomes worse, the system is profoundly infected, and any further local treatment of the uterine cavity will do more harm than good.

Local treatment is especially useful in ordinary sapræmia, which it generally cures at once. It also produces very satisfactory results in a certain proportion of cases of mild infection.

Other forms of local treatment are suitable for pelvic cellulitis and pelvic peritonitis, especially after the exudations can be detected. Vaginal douching, according to the directions given by Emmet about twenty-five years ago, is generally soothing and promotes the absorption of the inflammatory product. It fell into disrepute a few years ago, but now seems to be returning again to popularity. Douching to be effective should be administered in a thorough and careful manner by the physician or a skilled nurse. The patient should not be made uncomfortable, the pelvis should be on a higher level than the shoulders, a good douche pan should be used, the temperature of the water should be 115°–118° F. One or two gallons of water should be used for a douche, which should be given twice a day, if it does not cause fatigue. As to that, much will depend on the skill of the nurse.

It is well in most cases to paint the groin occasionally with tincture of iodine. Garrigues does this once a day, and then covers it with a piece of lint soaked in this lotion,

℞ Acidi carbolici..... ʒ j (4 gm.),
Glycerini } āā..... ʒ iij (90 gm.),
Aqua }

with the expectation that it will prevent the skin from cracking, and allow one to continue the use of the iodine and favor its absorp-

tion. When the tenderness has subsided sufficiently to allow a speculum to be introduced, he also paints the vault of the vagina every three days. One should be careful not to use too much tincture of iodine, and it should be applied with a very small pledget. I prefer to use, instead of the tincture, equal parts of the compound solution of iodine and glycerine every day or two, taking care not to use too much. Reference will be made to the treatment of abscesses in connection with operative treatment.

Operative Treatment.—When the streptococci have passed beyond the reach of the curette, Henrotin advises certain operative procedures with a view of stopping the ravages of the organisms before the entire system is poisoned. When the germs pass through the uterine walls they set up a peritonitis, or parametritis, or both. A fibrinous and serous exudate is thrown out which accumulates in the pelvis or in the general peritoneal cavity. Henrotin opens the posterior fornix of the vagina and passes the finger through this opening into the peritoneal cavity, with a view of draining away as much of this fluid as possible. After a thorough exploration with the finger he packs the *cul-de-sac* with iodoform gauze. Pryor approves of this plan. He thinks it is especially useful when there is a mixed infection, as, for instance, saprophytes and streptococci together. Mann also goes somewhat farther with this operation, and opens recent accumulations of pus within the tubes or broad ligaments. He tells us the opening of the *cul-de-sac* is a very simple operation, attended with little or no risk, and when nothing is found the wound heals in a very short time. Our results from this operation in Toronto have been somewhat disappointing.

In a certain proportion of cases we have a pelvic abscess. The proper treatment for such an abscess is to open it and give free vent to the pus. If the abscess is not interfered with it generally opens in time through the wall of the bowel. It may, however, open into the bladder, uterus, vagina, or externally, above or below Poupart's ligament. After discharging for a time the hard wall surrounding the abscess may become absorbed and a complete cure may be the result.

The following rules as to active interference will, I think, fairly represent the views of the majority of conservative obstetricians:

Active curettage, especially with a sharp curette, or even with a large dull wire curette, is dangerous.

Garrigues's opinion in this regard is worth much. He says he does not remember to have seen a patient recover when the curette was used after sepsis had set in after childbirth.

Henrotin's operative methods are not always followed by satisfactory results.

A pelvic abscess, whether cellular or peritoneal, should always be opened and freely drained.

Puerperal Ulcers.—Ulcers are frequently found and vary to a considerable extent in size. They generally have a gray, sloughing base, with an inflamed margin, situated on lacerations of the genital tract. Local treatment is all that is necessary for such ulcers. Do not use a vaginal douche, for fear of carrying some of the discharge from an ulcer into the uterus. It is well to have the head of the bed raised in order to favor free drainage. Introduce a speculum, get a good view of the ulcer, and apply pure carbolic acid and then iodoform powder; or nitrate of silver, 40 grains to the ounce.

Medicinal Treatment in Addition to the Administration of Cathartics.—Probably the best drug at our disposal is alcohol. The patient should take as much as possible. Jellett says that she should have as much as she can be urged to take without any qualification, and he considers that the amount should be about from 16 to 24 ounces in twenty-four hours. Reynolds recommends us to give whisky in sufficient quantities to preserve a normal fulness of the pulse without producing any loquacity or dizziness —that is, we should stimulate as much as possible without producing intoxication. Jewett recommends the administration of a quart of brandy or its equivalent daily, and recommends that whisky, brandy, and the wines be used in alternation.

Certain tonics are useful, and are said to hinder waste and to promote oxidation of the toxines and the products of tissue disintegration. The best of these is probably strychnine, $\frac{1}{30}$ of a grain every three to six hours. Quinine, 1 grain with 10 minims of hydrochloric acid every four to eight hours, appears to answer in some cases better than strychnine. It was the custom, especially a few years ago, to give quinine in large doses to reduce the temperature. I seldom use quinine for this purpose, never unless the temperature is over 104°. Jewett says that large doses are

injurious by hindering oxidation. Tincture of digitalis or tincture of strophanthus in 10 to 15 minim doses, given every four to eight hours, are useful for weak heart. Some, however, prefer to use sparteine or caffeine for heart depression. Coal-tar antipyretics, such as antipyrine, antifebrine, have been used to bring down the temperature, but they are dangerous from the fact that they act as depressants. Robbin tells us that they also hinder elimination of microbic poisons and the products of tissue disintegration by preventing their oxidation.

Feeding.—The most important matter in connection with feeding is probably the administration of fluids in as large quantity as possible, and especially water, either plain or mild alkaline mineral waters. It has been found by experiments on animals that the quantity of septic poison required to intoxicate is doubled or trebled when the animal drinks abundantly of mildly alkaline waters. Alkalies are believed to facilitate the combustion of organic substances in the blood. Diuretic drugs are used by many, acting on the view that it is well to endeavor to eliminate the poison by all the emunctories, but especially the skin, kidneys, and bowels. Plain water is the best diuretic.

Give opium and morphine in full doses for severe pain, but it is advisable to have the bowels freely moved before and during the administration of opiates. Some take a rather extreme view of the effects of opium and say that opiates should not be used at all. During the last few years there has been a reaction against this view. Garrigues uses opium or morphine in very large doses for puerperal peritonitis. He endeavors to give prompt relief by injecting hypodermically at the beginning $\frac{1}{4}$ of a grain of morphine, and giving thereafter by the mouth $\frac{1}{8}$ or $\frac{1}{4}$ grain every half hour until the patient is fully under the influence of the drug—i. e., free from pain, but not too deeply narcotized to prevent her from being aroused. When the heart is weak a little atropine may be combined with the morphine.

If the patient has general peritonitis with severe pain when first seen it is probably better to follow Garrigues's advice. First narcotize sufficiently to relieve pain; then give enemata: glycerine (℥ ij-℥ iv), or a quart of flaxseed-meal tea containing one or two tablespoonfuls of castor oil and a dessertspoonful of glycerine. A teaspoonful of inspissated ox-gall (*fel bovis*) may be added. For vomiting give cocaine hypodermically, gr. $\frac{1}{8}$ (8 gm.) every

two to four hours, or hydrocyanic acid by the mouth according to this formula (Garrigues):

℞ Acidi hydrocyanic diluti ..... ʒ ss. (2 gm.);
Acidi citrici
Sodii bicarbonatis } āā ..... ʒ ij (8 gm.);
Syrupi rubi idæi ..... ℥ ss. (15 gm.);
Aquæ destillatæ ad ..... ℥ vj (180 gm.).
M. Sig.: A tablespoonful every one, two, or three hours.

Unguentum Credé has been used for some years on the Continent and in some parts of the United States. It contains silver in a soluble form called collargolum, which, after absorption, enters the lymphatics and circulates in the blood. The collargol may also be injected under the skin or into a vein, or it may be taken by the mouth, or be placed in certain cavities, such as the uterine and peritoneal cavities. In inunction (the method generally employed) thirty to forty grains (2–3 gm.) of the ointment are rubbed once a day into the skin, where it is soft and free from hair, as, for instance, the inner sides of the arms or thighs. This procedure is said by some to yield good results in general systemic infections.

Marmorek's Antistreptococcic Serum. — Among the various antitoxic serums which have been used during the last ten years, none created more interest for a time than the antistreptococcic serum. Much was expected of it, but the results in the majority of cases were quite disappointing. A committee appointed by the American Gynæcological Society condemned it in a report which was presented in May, 1899. Their investigations indicated, however, that the serum was practically harmless, but many observers have concluded that it is quite injurious. It should be remembered that in many cases the serum was only used after curettement—an operation with a very bad record.

In August, 1899, the subject was fully discussed at the meeting of the British Medical Association. Herbert Spencer's conclusions (generally endorsed) were:

1. Serum therapy, as usually applied, has not a scientific basis.
2. It has not lowered the mortality of puerperal sepsis.
3. It usually lowers the temperature and sometimes improves the general condition.
4. Its use is not free from danger.

It is unfortunate that the subject of serum therapeutics remains so long indefinite. This is partly due to the fact that the standards of strength of most of the antitoxic serums are, to a certain extent, uncertain. Probably the only exceptions at present are the antidiphtheritic and the antitetanic serums. The doses and the effects of dosage in the case of these two serums are fairly definite, and the results in the treatment of diphtheria and tetanus, in the opinion of the great majority of clinicians, have been eminently satisfactory. Let us hope that in the near future we may get equally satisfactory results from the use of antistreptococcic serum in suitable cases. After having passed through various phases of hope, doubt, and actual unbelief, I now hold opinions which are not in accordance with the report of the Committee of the American Gynæcological Society. These may be briefly expressed as follows:

1. The injection of Marmorek's serum does occasionally cure antistreptococcic infection.

2. The serum is not always harmless; it is frequently injurious.

Unfortunately, those who believe in the occasional efficacy of the remedy cannot give any definite rules for guidance.

During my own attack of septicæmia in the fall of 1900, Drs. Caven and Bruce determined to try the serum. It was injected at a time when I was suffering from intense pain, which was but little influenced by morphine. The pain appeared to be deeply seated in or near the left hip joint. After the injection I gradually got a sensation as if something were warming the stagnant congealed blood within my heart. This warm blood soon commenced to flow in all directions, and as it did so my pain scattered and finally disappeared, causing a delicious feeling of rest and peace, followed shortly by an inclination to take some interest in my surroundings and a desire to live. How much hysteria there was in me at the time I know not, but it appeared to me that the serum brought me back to life. I know very little as to particulars, as I have never consulted the history or the charts; but I understand that my medical attendants, Osler, Caven and Bruce, thought that it accomplished much good.

McIlwraith has published some histories of cases coming under our observation. In one instance I watched the patient very carefully and thought that she showed marked improvement after each injection (as shown by effect on temperature, pulse, and in other

ways), and finally made a good recovery. I have seen some patients on whom the serum treatment appeared to have a bad effect; other patients on whom it appeared to have no effect whatever.

I should recommend the following rules:

Use the serum in cases of acute septic infection where the patient is steadily growing worse under ordinary treatment—i.e., practically as a last resort.

Do not use it in cases of mild septicæmia, chronic septicæmia, pyæmia, or in localized infections.

Directions as to Injections.—Make the initial dose 20 c.c., never less. Watch the effect of this, and if patient shows any signs of improvement, inject 10 c.c. every twelve to twenty-four hours for three or four days. In the Toronto General Hospital we have generally injected between the shoulder-blades.

Nuclein, a substance obtained from yeast, has been used to produce an artificial leucocytosis with a hope that the leucocytes, with large reinforcements, may be able to destroy the pathogenic microbes. Hofbauer reported favorable results from its administration in 1896. Hirst has used it for some years and speaks favorably of it. The nuclein solution is given hypodermically, or by the mouth, according to directions issued by the manufacturer. The initial dose is usually 10 minims (60 centigrammes) hypodermically twice a day, or ʒ ss. (2 gm.) by the mouth. The dose is generally increased slightly from day to day.

Enemata and Subcutaneous Injections of Normal Saline Solutions, as recommended for toxæmia and eclampsia, should always be given. Intravenous injections are used by some; but they are probably no more efficacious than the subcutaneous injections, require great care and considerable skill in technique, and are more or less dangerous.

Atmokausis—i. e., the intra-uterine use of steam—has been employed, but has been followed in many cases by results so disastrous that it is worthy of no favorable consideration.

Hysterectomy.—This operation has been performed by a few with the aim of removing the infected uterus before the microbes have invaded the general system; but it is hard to conceive of a case where the uterus is so affected as to require removal without general infection.

The following brief notes of some cases in practice will illus-

trate certain points as to the nature and treatment of puerperal infections.

Mrs. A., aged thirty. Labor normal. Felt ill on second day, grew worse until I saw her on the fifth day after delivery. Pulse 125, temperature 104°. Lochia offensive, with ordinary symptoms of sepsis. Chloroform administered; vulva and vagina washed; hand introduced into the vagina, two fingers into the uterus; scraped the interior of the uterus, bringing away considerable débris. Intra-uterine injection of hot water; uterine cavity packed with iodoform gauze; also vagina packed loosely, gauze left in twenty-four hours. When the gauze was removed patient's temperature was 99°, pulse 100. Patient was then practically well; there were no other serious symptoms.

This was probably an ordinary case of uncomplicated sapræmia. I have frequently asked members of my classes the following question: If you see a patient on the fifth day after delivery and find high temperature, rapid pulse, headache, sleeplessness, etc., with offensive lochial discharge; if you see another patient with similar symptoms but no offensive lochial discharge, which of the patients is probably in the worse condition? The answer has frequently been, the patient having offensive lochial discharge. Such answer is generally, at least, wrong, because in many very serious cases of streptococcic infection the lochia are not at all offensive at any time. When there are bad symptoms with no change in the lochia there are probably serious constitutional conditions with general systemic infection. But when the lochia are offensive there is reason to suspect that the condition is due to the decomposition in consequence of the presence of saprophytic bacteria. Nothing can be more satisfactory than the results of treatment in simple sapræmia.

Mrs. D., aged thirty-five. III para. Labor normal. Suffered from headache, sleeplessness, and chilly feelings during the second week. Pulse slightly rapid, temperature occasionally increased a little. Symptoms supposed to be due to nerve disturbances. I first saw the patient on the fifteenth day after delivery. Temperature 103°, pulse 120, every evidence of serious illness. Pain and tenderness in left iliac region. Internal examination showed swelling and tenderness on the left side of the uterus. In a few days—that is, in about three or four weeks after labor—a well-defined mass could be felt between the left of the cervix uteri and the left iliac fossa. This mass remained without much change for some weeks, when there was a free discharge of pus from the rectum. This discharge continued, more or less, for four weeks. After the dis-

charge ceased the hard wall of the abscess appeared to melt away slowly and patient made a fair recovery. Eight months after labor the uterus was apparently normal in size, and freely movable. There was no local manifestation of any pelvic lesions.

An important question might come up in connection with this case. Would it not have been better to open the abscess in such a way as to have free drainage? The proper answer is, Yes. In a large proportion of cases of pelvic abscess it is a very simple matter to make an opening and evacuate the pus. The abscess has been formed in the cellular tissues, generally, if not always, between the layers of the broad ligament, and has separated these layers and pushed the peritonæum upward as it increased in size. Under such circumstances, after it has reached a point some inches above the pubes, the abscess may be opened without exposing the peritoneal cavity. In this case the patient and her friends absolutely refused to allow any operative interference.

Mrs. S., aged thirty. Had two children and three abortions. September 22d advanced three months in pregnancy, abortion. Attended by Dr. K. September 24th and 25th, temperature 100–101°, pulse 110. September 26th, temperature 102°, pulse 120. Chloroform administered by Dr. L. Dr. K. introduced hand into vagina and finger into the uterus; removed uterine contents and packed with iodoform gauze. September 27th, patient better in the morning. At one o'clock seemed not quite so well, temperature 101°, pulse 110. Dr. K. removed gauze, washed out the uterus, and curetted. Little or nothing found in the uterus. At 4 P. M., temperature 104°, pulse 120. At 11 P. M. I saw the patient in consultation with Dr. K. Temperature 102.5°, pulse 140. On vaginal examination found os contracted, could not introduce finger. Uterus not tender. After I was in the room twenty minutes, pulse 120. I advised no further interference. September 28th, patient much better, temperature 100°, pulse 100. September 30th, patient completely recovered. Temperature and pulse normal.

When I was called in to see the patient on the night of September 27th I was considerably puzzled. It will be noticed that at four o'clock in the afternoon temperature was 104° and pulse 120. When I saw her at eleven o'clock the temperature was 102.5°, pulse 140. I thought it a favorable sign to find the temperature reduced, and I thought at the same time that the rapidity of the pulse (140) might be due to nervous causes produced by my entrance into the room. I was pleased but not greatly surprised

to find in twenty minutes that the pulse was only 120. I considered carefully what Dr. K., a very competent and careful practitioner, had done. He had, in my opinion, done exactly the right thing in having his patient anæsthetized, and thoroughly exploring and clearing out the uterine cavity and packing with iodoform gauze. I do not know why the temperature and pulse were abnormal the next day at one o'clock, but I think I can tell the cause of the condition at four o'clock, with temperature 104°, pulse 120. This was almost certainly due to the intra-uterine douche and curettement. As before stated, the intra-uterine douche *always* produces some, and sometimes very considerable, constitutional disturbance. I also feel certain that curettement in this case was worse than useless. This case has been described somewhat in detail to illustrate the fact that an honest and conscientious physician may do too much rather than too little.

In this connection I wish to give a report of another case with a very sad ending:

Mrs. C., aged twenty-eight. Two children. Four months advanced in pregnancy. Abortion. First attended by Dr. X. Two days after came under the care of Dr. Y. Nothing known about Dr. X.'s treatment. Dr. Y. gave intra-uterine douches every four hours for about a day and a half. I was called in on the morning of the fifth day. Temperature 99°, pulse 150, extremities cold. Patient felt comfortable, faculties clear, but she was evidently dying. Dr. Y. washed out the uterus again in my presence, the return flow being perfectly clear. We were simply douching a dying woman without any possibility of doing any good, because the poison was not situated in the uterine mucosa, but had traveled far beyond that into every part of the system. In this instance I had no idea that the douching did any particular harm, but I am certain it was doing no good, and I am greatly opposed, as I have before intimated, to the use of intra-uterine douche when I am sure that it is at least unnecessary. The patient died in about half an hour after the last douche—that is, probably about four days after infection. This is a typical example of death from very acute sepsis with the condition called euphoria.

The following is a typical example of that condition produced by septic infection which has long been known to clinicians as pyæmia:

M. M., aged seventeen. Single. A strong, healthy girl, delivered of a well-developed male child March 28, 1893, at the Burnside. Three stitches introduced in a torn perinæum, sterilized silkworm-gut being used. On the evening of March 30th (60 hours after delivery) pulse 92.

Next morning pulse 95, temperature 100.6°. Magnesium sulphate administered until bowels moved freely. Condition improved for three or four days. Stitches removed seven days after labor. A little pus found in one stitch hole. No union. Patient complained of pain in her right leg and arm April 6th (nine days after labor), arm swollen. April 9th (twelve days after labor) patient was anæmic, breathing very rapidly, right forearm red and swollen on dorsal aspect, the affected part being exquisitely tender. Left arm also swollen and tender. Calf of right leg slightly swollen and very tender. No pain or distention of abdomen, no headache; took nourishment well; pulse 120, temperature 102.2°, respiration 40. Free incisions were made in right forearm and left arm, the knife being carried to the bone. The subcutaneous tissues of the right forearm presented a very peculiar appearance, gray in color, looking something like clear transparent jelly, no pus nor fluid of any kind. Only the subcutaneous tissues affected. Discharge from wounds became purulent three days after incision, contained streptococci in abundance. In addition to these local measures patient was treated by free stimulation, taking about twelve ounces of whisky in twenty-four hours. For a time quinine was administered, but without effect. Salol was substituted, but it disturbed her digestion and was discontinued. The patient's condition gradually became worse, persistent high temperature 101° to 105.6°, remarkably rapid respirations, ranging during the last week from 36 to 74 per minute, more rapid during sleep. Patient restless, very nervous. Lips quivered but never had an actual rigor. Amount of pus discharged from wounds never very great. Died April 21st, twenty-four days after confinement.

Post mortem by Professor Caven. No abscesses in internal organs. Peritonæum normal in appearance, uterus enlarged and soft, vagina normal. Careful dissection of the vagina and broad ligament, after removal, showed the veins running from the neighborhood of the perineal lacerations to be partly filled with puriform clot and to present the appearance of acute phlebitis.

Microscopic examination demonstrated the presence of streptococci in great numbers in the clot. Posterior aspects of both forearms and of the left arm presented an extensive subcutaneous suppuration spreading widely beneath the skin, but to a very slight degree along the intermuscular septa. On the left side there was also subcutaneous suppuration over the back of the hand, extending to the roots of the fingers. The calf of the right leg, on incision, was found in the same condition as the arms, the suppuration being extensive but strictly limited to the subcutaneous tissues; about twelve ounces of pus found here. Phlebitis was found extending up into the thigh.

Dr. Primrose assisted me in taking care of this patient, making the incisions and looking after the dressings. There were many

interesting points connected with the same, some of which I could never clearly understand. While I call it a case of pyæmia, I consider it a form of septicæmia which frequently ends in recovery. The nerve centers were not suddenly overpowered by the intensity and virulence of the poison, as is the case in the most malignant form, which kills so rapidly and leaves little in the way of gross lesions to be found post mortem, and yet the blood-vessels appear to have been the principal carriers of the poison; conse-

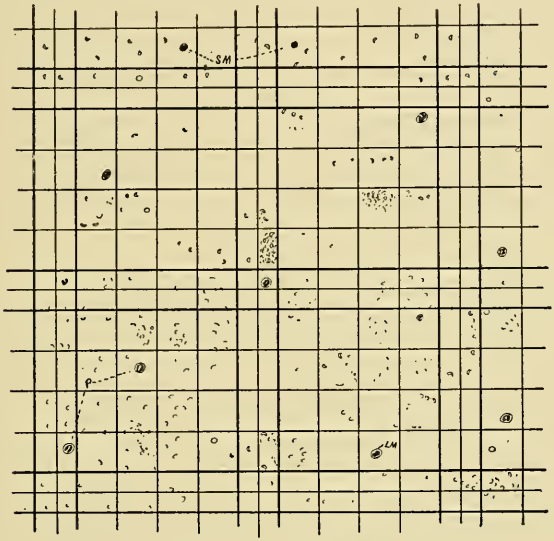


Fig. 162.—Leucopœnia.

144 squares Thoma Zeiss diluted 1–10 0.3 per cent. acetic acid, methyl green. *P*, polymorphnuclear; *LM*, large mononuclear; *SM*, small mononuclear (W. N. Meldrum).

quently I should suppose there was no let or hindrance to a rapid infection of the whole system. The serous and mucous membranes were remarkably free from any signs of serious infection. It belongs to that class of cases in which the superficial parts of the body are especially affected. While the force of the poison appears to have been expended in the subcutaneous tissues, there must have been a serious infection of certain nerve centers which produced the extreme rapidity of respiration which was out of proportion to the accompanying symptoms. Why this rapidity

of respiration was most marked, as a general rule, during sleep, I do not know.

It will be noticed in the synopsis of Dr. Caven's post-mortem report that there was a collection of pus strictly limited to the subcutaneous tissues in the calf of the right leg. It caused me great surprise to find that there were twelve ounces of pus in this region. We made incisions in other parts. Why did we make none here? We at one time suspected the presence of pus and intended to incise. Another careful examination shortly after gave us the impression that our previous opinion was wrong and consequently no incision was made. The lesson to be learned is that in all such cases the rule should be, when in doubt as to the presence of pus, to incise without waiting for positive evidence.

Another case of pyæmia. Mrs. D., IV para, admitted to General Hospital ten days after labor. Symptoms of septic infection. After a couple of weeks some doubt as to diagnosis. Typhoid fever

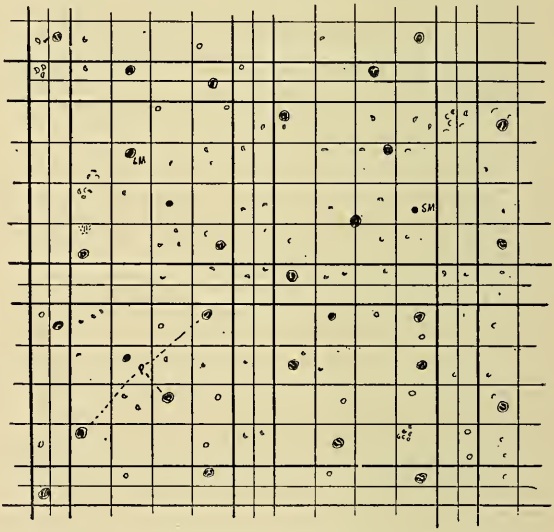


Fig. 163.—Normal Blood.

P, polymorphnuclear *LM*, large mononuclear; *SM*, small mononuclear (W. N. Meldrum).

suspected. Blood examination by Dr. McLaurin. Widal test, negative. Leucocyte count, 30,000. After a few days several abscesses developed, the first being in the vulva, and were opened. Patient recovered after a long illness.

Brief reference is made to this case on account of the leucocytosis. Much was expected a few years ago from the leucocyte count as an aid to diagnosis in suspected pus formations. The

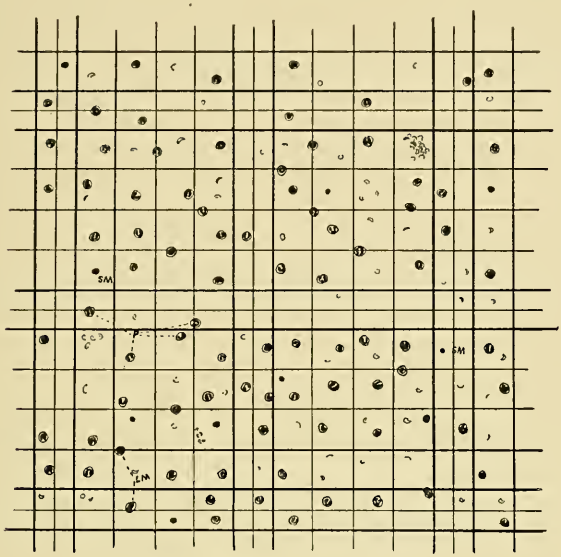


Fig. 164.—Leucocytosis.

P, polymorphnuclear; *LM*, large mononuclear; *SM*, small mononuclear (W. N. Meldrum).

results of investigations were in many respects unsatisfactory, and it is the habit of many now to belittle the significance of such count.

I think, however, we may obtain much assistance from the leucocyte count in certain cases. The following facts as to leucocytosis are generally admitted. There is a slight leucocytosis in pregnancy, which increases for two or three days after labor and then decreases up to the end of the first week, when it ceases. There is no leucocytosis in a large proportion of cases of acute septicæmia, especially the rapidly fatal forms. There is generally leucocytosis in puerperal infection with the formation of abscesses. There is little or no leucocytosis with some forms of chronic abscess, especially those due to tubercle bacilli and gonococci. A leucocytosis of 20,000 to 30,000, continuing three days, generally indicates pus formation.

This case may be compared with that reported on page 233, a case of supposed septic infection which was probably typhoid fever. It seems probable in certain cases that a marked leucocytosis, with negative Widal results, furnish strong evidence of pus formation, while a marked leucopœnia, with a positive Widal reaction, will furnish strong evidence of typhoid fever.

CHAPTER XXII

PUERPERAL INFECTION (Continued)

Phlegmasia Alba Dolens; Femoral or Crural Phlebitis; Milk Leg; White Leg.

This is a peculiar swelling of the lower extremity (very rarely the upper extremity), white in appearance, accompanied with great pain and general constitutional symptoms. Occasionally both legs may be affected, but seldom does the affection begin in both at the same time.

The symptoms nearly always appear in second or third week, although before this time there have been some of the premonitory signs of septicæmia, such as headaches, insomnia, etc. There is very severe pain during the acute stage, which abates after the hard, brawny condition gives place to soft œdema. There is swelling, which is at first hard and brawny, with a glistening white surface. It commences sometimes in the thigh, sometimes in the leg, occasionally in the neck or arm. There are also general malaise, rapid pulse, increased temperature, and usually constipation.

Coagula are generally felt along the course of the veins. The other limb may become similarly affected. The acute painful stage lasts a week to a fortnight.

The whole duration is from four to six weeks—sometimes longer.

Phlegmasia alba dolens is probably always due to mild septic infection. It received the name milk-leg because it was once thought to be caused by a metastasis of milk. There is generally present a phlebitis and occasionally a cellulitis, or both phlebitis and cellulitis. The simple thrombosis of the veins of the leg—sometimes called a marantic thrombosis—should not be included. It is so seldom found in the upper extremity that many authors do not mention the possibility of puerperal phlegmasia dolens in the arm and neck.

Two cases have come under my observation, and Spence of Toronto has reported one case. My first case caused me much

anxiety for a couple of days. The patient was doing fairly well for about ten days, when a brawny swelling suddenly appeared in the neck, accompanied with very severe pain. The swelling gradually extended down the arm, forearm, hand, and fingers. After

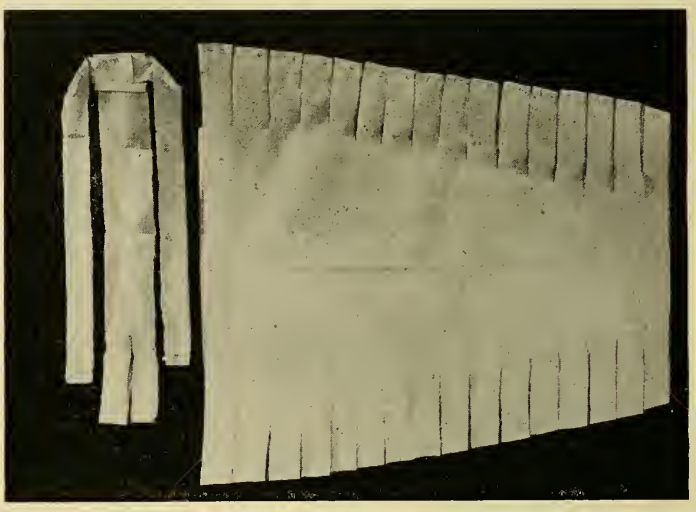


Fig. 165.—Many-tailed Bandage on the Right. T-bandage on the Left.

a few days the brawny induration changed into a soft œdema, and the pain disappeared. The swelling gradually subsided and the arm was fairly well in five weeks, although it remained weak for several months.

In the other case (Dr. McPhedran's patient) phlebitis appeared in left leg and thigh one week after labor, in the right leg fifteen days later, and left side of neck three days later. The swelling soon extended down the arm to fingers. The pain in neck and arm was much more severe than that in the legs. Recovery took place in reverse order: arm first, right leg second, left leg third. The illness lasted altogether about four and a half months.

The most important feature from a therapeutic standpoint is the extreme pain which the patient suffers during the time of the hard brawny swelling. The patient should get large doses of opium during this time. If the pain is thus kept in check, I think as a rule the length of the illness will be diminished. Lotions are not of much service, but the dry poultice should always be applied. In

doing this surround the limb with cotton wool, cover with oil silk, and keep the dressing in position with a many-tailed bandage, and not by an ordinary roller bandage such as is too often used. Keep the limb, as far as possible, absolutely at rest and slightly elevated. Do not use friction at any stage, for fear of separating a portion of the clot. Keep the bowels fairly open and give good food and strychnine.

Pulmonary embolism is one of the possible accidents of the puerperal period. Generally, if not always, there has been a previous thrombosis in some of the veins of the pelvis or lower limb. The embolus, after it is broken off, travels toward the heart, and when large may be arrested in the heart, causing sudden death, or it may pass through it into the pulmonary artery. When it completely blocks the main trunk of this artery it causes death, as a rule, in a few minutes. When a smaller plug blocks merely a branch of the pulmonary artery it may cause severe symptoms,

FIG. 166.—MANY-TAILED BANDAGE PARTIALLY APPLIED.

but the patient will probably recover. When the embolus is arrested a secondary thrombosis is likely to occur.

Symptoms.—The symptoms generally appear suddenly and are so well marked that one can hardly fail to recognize them. The patient is seized with the most intense and distressing dyspnœa. She gasps and struggles for breath. Although air does actually enter the lungs, she still has the feeling of suffocation. The face generally becomes purple, although occasionally it is pale. The

action of the heart is at first violent, but it soon becomes weak and irregular, and the pulse becomes small, rapid, and irregular. Death may occur in a very short time. A patient of the late Dr. Burns, who was apparently doing well, had a sudden seizure fifteen days after labor and died in about five minutes. Dr. John L. Bray had three similar cases, in which the patients died in nine, ten, and eleven days respectively, after labor. Sometimes after the serious symptoms have lasted a few minutes the patient gradually improves and recovery takes place. It is, of course, very important to keep her absolutely quiet. Stimulants, such as

Fig. 167.—Many-tailed Bandage Applied for Phlegmasia Dolens.

whisky, ether, and ammonia, may be administered. Oxygen may be inhaled. Opium should be given after the urgent symptoms have subsided. Venesection may be performed if there is marked cyanosis.

GONORRHŒAL INFECTION

Whatever doubt there may have been about the matter in years past, it is now generally conceded that gonorrhœa is caused by the gonococcus. Some say that this peculiar germ is septic, while others deny that it alone can produce sepsis. Galabin says the gonococcus appears to be capable of acting on certain organisms under certain circumstances. Mann says that the gonococci are much milder and slower in their action than are the septic germs, meaning, I presume, that the former are not alone capable of producing sepsis.

Without attempting to discuss the different views, I shall consider the gonococcus an ordinary septic microbe. We know, from clinical observation, that gonorrhœa produces serious results in the female, and therefore we are inclined to look upon the gonococcus as the direct, or indirect, agent in the production of such results. The parts attacked in the early stages are the vulva, urethra, Bartholinian glands, cervical canal, and perhaps to a certain extent the vagina.

In the majority of cases of acute gonorrhœa the disease is set up in the cervix and vulva at the same time, but there is no certain rule as to this, and it not infrequently happens that the cervix is at first attacked and the external parts afterward, and in a few cases it appears that only the vulvar region is infected. When all the acute symptoms have disappeared the germs may still be present in the region of the urethral orifice, in the ducts of the Bartholinian glands, and in the cervix.

The disease is apt to extend slowly along the genital tract, extending upward from the cervix, along the uterine mucosa, along the Fallopian tubes, and perhaps into a small portion of the peritoneal cavity. It fortunately happens that it does not spread to this extent in the majority of cases. It is also a fortunate circumstance that its progress is very slow, as the disease in any case is not likely to reach the tubes in less than six weeks to two months. It is said that it has been known to reach the tubes in ten days after infection. While I do not deny the possibility of this, I think such cases must be very rare. According to Schmitt, as quoted by Herman, gonorrhœa extends to the uterus in about one case in five, and to the tubes in about one case in twenty.

The most important site of infection, from an obstetrical point of view, is the cervical canal. The germs may lie in this canal for months or even years. They often lie here during the whole of pregnancy without any attempt to spread. After labor the conditions are entirely changed, and the germs, which were before apparently asleep, become actively wide awake. This is probably due to the fact that the lochia afford a good culture medium for the germs, which, under the new conditions, thrive, multiply, and spread until they have traversed the entire genital tract. Nature steps in here in a very remarkable way to prevent these germs from going far beyond the tubes. We have the salpingitis and frequently ovaritis, but, generally speaking, the pavilion of the tube

is sealed up by adhesive inflammation. Pryor says that we have a gluing together of the fimbriæ, or else an attachment of the tube to some adjacent structure, usually the ovary, which causes the occlusion of the tube. But he adds that generally the uterine end of the tube is also occluded. We thus have the tube entirely shut off not only from the peritoneal, but also from the uterine cavity. One of the effects of such occlusion of both tubes is sterility. In many cases a woman becomes infected during her first pregnancy; such infection more frequently occurs probably early in pregnancy, although it may happen at any time. If early, the acute symptoms will have passed away probably in a few weeks and the germs will be situated in the lower part of the cervical canal. After labor double salpingitis sometimes occurs, producing a condition called by Sänger "one-child sterility."

Some obstetricians justly dread the presence of gonorrhœa, especially at or near the time of labor, and if puerperal infection takes place during the first week after labor they are apt to think that it is caused by the gonorrhœa. The gonococcus cannot, however, cause the infection in so short a time. Nor does it do so even when the patients have a copious gonorrhœal discharge during labor. Sänger found in the Leipzig Clinic that 26 per cent. of pregnant women had gonorrhœa; Oppenheimer, in the Heidelberg Clinic, found 27 per cent.; Lohmer, in Berlin, found 28 per cent. These observers all agree that, notwithstanding the large proportion of women infected with gonorrhœa, the mortality in all the hospitals was small, showing that gonorrhœa has but little effect in the early weeks after labor, and seldom or never causes the ordinary puerperal infection. In fact, Sänger says that a gonorrhœal woman runs, in the first few weeks after labor, little more risk of septic infection than any other puerperal woman. Pryor, after quoting Sänger as above, says that when she has ceased to be puerperal she becomes liable to complications incident to gonorrhœa. He points out, as was before shown by Baumm and Fenger, that the squamous epithelium of the adult vagina, the endometrium of the puerperium, and also the endometrium of the nulliparous uterus, have great resistant power against the spread of gonococci. He adds that gonorrhœa runs a shorter course in the female than in the male and with less risk of complications. Fenger, in referring to the fact that a general peritonitis rarely or never occurs from gonorrhœa, says that Mercier reports a typical case of

a strumpet who died while suffering from gonorrhœa. The autopsy showed the uterus deeply infected, tubes distended by muco-pus, the fimbriæ closely adherent, and the peritonæum healthy.

Therefore, if we care for our patient during labor in a cleanly way, we shall not find any evil results from the gonorrhœal infection for some weeks; but if we introduce, or allow to be introduced, any streptococci or any staphylococci, we have reason to believe that we shall then have a mixed infection, in which the two forms of germs will materially aid each other in their destructive ravages. As pointed out by Mann, the pure gonorrhœal infection usually shows itself in the third or fourth week, whereas the mixed infection develops soon after labor.

We must not conclude from these facts that the gonorrhœa does not produce serious and lasting results. Salpingitis, ovaritis, and the other inflammations in the neighborhood of the uterus, produce at least two very serious results, the first being the condition of sterility, the second being the more serious condition of permanent loss of health.

Pus Tubes.—We hear much about pus tubes, and I fear that many of our physicians and surgeons have only hazy or incorrect ideas as to their cause and results. Some have talked of pus tubes as if they were always produced by gonorrhœa. Gonorrhœa, in a certain proportion of cases, does certainly cause pus tubes; and I have studied statistics pretty carefully in order to find its probable frequency as a cause. So far as I have learned, I can find no careful observer who considers that gonorrhœa is the cause of pus tubes in more than 20 to 30 per cent. of all cases. The most common cause is septic infection after abortion or labor.

It may be added in connection with this subject, that pus tubes due to gonorrhœal infection never cause puerperal fever. There has been a great deal of confusion in the past about the germs found in these purulent collections in the tubes. In a fairly large proportion of cases no organisms of any sort can be found. This is due to the fact that bacteria confined and encapsulated in closed pus cavities soon lose their virulence; they die from their own products, the toxines. The average time in which the pus thus becomes sterile is about nine months.

CHAPTER XXIII

DEFORMITIES OF THE BONY PELVIS AND INJURIES TO THE CHILD DURING DELIVERY

Deformities of the pelvis include all variations from the size and shape of the normal pelvis.

These variations are nearly always contractions. No others need be considered.

The contractions which affect labor are chiefly those at the brim.

The most important of these is contraction of the antero-posterior or conjugate diameter.

CAUSES AND FORMS OF DEFORMITY

The causes and varieties generally recognized are as follows:

Causes.—1. Rickets—producing changes in the shape of the pelvis in early life before the bones are properly ossified.

2. Osteomalacia—producing changes in adult life through softening of bones that have been properly ossified. Much less common than rickets.

3. Displacement of bones in or near the pelvis, such as forward and downward displacement of lower lumbar vertebræ (spondylolisthesis), and displacements of sacrum from curvature of spine.

4. Diseases of the pelvic bones from tumors, etc.

5. Interference with normal development of the pelvis producing the infantile pelvis.

The more common forms are:

1. Flattened pelvis.
2. Generally contracted pelvis, including the dwarf pelvis.
3. Obliquely distorted pelvis.
4. Spondylolisthetic pelvis.
5. Transversely contracted pelvis (Roberts's pelvis).

6. Funnel-shaped pelvis (masculine pelvis).
7. Rhachitic pelvis.
8. Osteomalacic pelvis.
9. Deformity from tumors, exostosis, etc.

Flattened pelvis is the most common form of pelvic deformity in Canada. In the majority of cases the patients do not show any traces of rickets, which is so commonly the cause in some countries. It is probably acquired during early life in some cases, while it seems to be the result of a congenital condition in others. The important feature is the shortening of the conjugate diameter —i. e., the antero-posterior diameter at the brim. It sometimes happens that a flat pelvis is also "generally contracted."

Generally contracted pelvis comes second in frequency as a form of pelvic deformity in Canada. Under this term are included the pelvis, which is equally and slightly contracted in all parts, and also what is called the dwarf pelvis. The difference between the two is chiefly one of degree, but in most of the dwarf pelves the word æquabiliter cannot be used in describing the contraction.

Obliquely distorted pelvis is by no means uncommon in this or any other country. There is in this deformity a deviation of a part or the whole of the pelvis toward one side, causing a marked difference in the length of the oblique diameters in all the planes of the pelvis. One form is called *Naegele's pelvis,* in which the distortion is caused by unilateral disease, fracture, or failure of development in the region of one sacro-iliac joint. Among other causes of the obliquely distorted pelvis are the various forms of spinal curvature, coxalgia, and unequal lengths of legs.

Spondylolisthetic pelvis is due to the forward and downward displacement of the fifth lumbar vertebra.

Transversely contracted pelvis or *Roberts's pelvis* consists in symmetrical narrowing and antero-posterior elongation of the pelvis. It is considered by some to be a sort of double Naegele.

Funnel-shaped pelvis is one whose internal diameters diminish from the inlet to the outlet.

Rhachitic Pelvis. The most common form of this is the rhachitic flat pelvis, which usually results from early rickets before the child walks. The patient is generally below medium height, with a pendulous abdomen and clumsy gait. The iliac crests are everted in front so that the interspinous diameter is relatively lengthened and is equal to or greater than the intercristal.

Osteomalacic pelvis or *malacosteon* is caused by a disease called osteomalacia, which does not occur in Canada, so far as I know, but is endemic in certain parts of Europe and other countries with hot climates. The disease causes extreme softening of the bones in adults, and frequently extreme deformity of the pelvis.

Deformity from Tumors, Exostoses, etc. Various bony tumors, both simple and malignant, in the pelvis cause serious obstruction to labor. Simple bony tumors include exostoses, ossifications of insertions of ligaments and tendons, masses of callus, results of rheumatoid arthritis, etc. Malignant tumors of the bone are generally sarcomata, but occasionally carcinomata. They are most likely to cause serious obstruction, because they grow very rapidly during pregnancy.

CONTRACTED PELVIS

The following conditions indicate the probability, or at least the possibility, of contracted pelvis:

Extreme smallness of figure.

Kyphosis (curvature of spine with convexity posterior).

Scoliosis (lateral curvature of the spine).

Lordosis (curvature of spine with convexity anterior).

Unequal length of legs.

Pendulous abdomen.

Difficult previous labor.

Variations from normal labor, such as:

Premature rupture of the membranes.

Prolapse of the cord.

Non-engagement of the head in the pelvis.

Descent of the large fontanelle with sagittal suture in transverse diameter of the brim.

Striking descent of the small fontanelle, as in generally contracted pelvis.

An extremely small woman generally has a small pelvis; a woman with marked curvature of the spine, with one leg shorter than the other or with pendulous belly, generally has a distorted or contracted pelvis. A patient showing any such conditions should be examined very carefully. If there is a dwarf pelvis or an extreme contraction of any sort, one can quickly come to a decision. The greatest difficulties as to passing judgment will arise in the minor degrees of contraction, when one has to con-

sider such alternatives as induction of premature labor, version, forceps delivery—or, to go a little farther, symphysiotomy, abdominal section, and embryotomy—and make a proper choice.

Variations from Normal Labor.—The variations of special importance are non-engagement of the head in the pelvis and abnormality as to either fontanelle. When one can easily feel the large or anterior fontanelle there is always something abnormal. It is generally satisfactory to be able to feel the small or posterior fontanelle after labor has advanced to a certain extent, but it is not satisfactory to be able to reach it early in labor while the head is at the brim. Some obstetricians attach considerable importance to this and designate it posterior fontanelle presentation, as distinguished from vertex presentation. It means undue or extreme flexion before the head has entered or when it is entering the brim. This abnormal position is commonly produced by a generally contracted pelvis causing sufficient obstruction to produce the early flexion, but it is also produced in the case of a very large fœtal head coming into a normal pelvis.

Mechanism of Head Presentation in a Flattened Pelvis.—This may be briefly described as follows:

The long occipito-frontal diameter of the head is in the transverse diameter of the brim.

As the head descends the posterior parietal bone is partially stopped by the promontory, causing the head to rotate on its antero-posterior axis, inclining a side of the head toward the corresponding shoulder. As a result the sagittal suture approaches the promontory and the anterior parietal bone lies lowest.

This is sometimes called *Naegele's obliquity* or *anterior parietal presentation.*

The head is caught between the sacrum and symphysis in front of the parietal eminence. Flexion is thus prevented and some extension takes place.

The posterior parietal bone generally rounds the promontory, is grooved vertically, and occasionally fractured.

In a small proportion of cases the posterior parietal bone lies lowest and the sagittal suture approaches the pubes. The anterior parietal then rounds the symphysis, the posterior parietal being grooved as in the other case. The posterior parietal presentation is much less favorable than the anterior.

As soon as the head passes through the brim the occiput

rotates to the front and delivery is completed as in the ordinary vertex presentations in the normal pelvis.

Mechanism of Head Presentation in a Generally Contracted Pelvis.—The extreme flexion of the head making the posterior fontanelle the presenting part at the brim is the chief feature of the mechanism, as before mentioned. Apart from this there is nothing special to note. If the contraction is not too great in proportion to the size of the head, the mechanism is similar to that of vertex presentation.

TREATMENT

Minor Degrees of Contraction.—Opinions vary greatly as to the proper treatment in cases of slight contraction of the pelvis—i. e., when the true conjugate measures 4 to 3¼ inches. I had a patient a year ago pregnant for the third time and supposed to have marked contraction of the pelvis. Ten years ago symphysiotomy at full term was performed by Drs. Atherton and Burns and a healthy child (still living) was extracted with the forceps. During her second pregnancy she was under the care of physicians in Charleston, S. C., who induced premature labor at the end of the seventh month. The child was born alive, but died in a short time. In her third pregnancy she came to Toronto (her home in girlhood) when six months advanced. After careful measurements, using Shultze's instrument for external pelvimetry, and fingers and Skutsch's instrument for internal, I concluded that there was slight general contraction without any flattening, and decided to watch her carefully and induce premature labor if at any time it seemed advisable. I thought that interference would not be necessary before the end of the eighth month and hoped she might go on to full term. As the head could always be pressed into the brim there was no interference until labor commenced about one week after the *expected* date. The vertex presented—O. L. A.—the head had entered the pelvis when I first examined her. At the proper time she was anæsthetized, and a well-formed living child weighing six and a half pounds was extracted with forceps without any special difficulty. The child died shortly after birth, from what cause I do not know.

It is not often that one patient in three successive pregnancies gets such varied methods of treatment. One can not give a positive opinion without knowing particulars as to whether symphysi-

otomy was necessary or advisable ten years ago; but certainly it was justifiable, and the results were eminently satisfactory in all respects. Similarly one cannot say, without knowing particulars, whether the induction of premature labor was necessary or advisable in the second pregnancy; but it is always a pity to have to deliver a fœtus at the end of the seventh month. Each week thereafter during the eighth and ninth months, under ordinary circumstances, increases the vigor of the child. In the third pregnancy it was easy to discover that the induction of premature labor was not necessary at any time in the eighth or the first half of the ninth month.

The following general directions as to treatment in minor degrees of contraction may be given.

When it is known or even suspected that the patient has pelvic contraction, an examination should be made at the end of the seventh month, and, if necessary, every week or ten days thereafter until it is found that the head can not be made to enter or engage in the brim.

Use Müller's method as follows: Place the patient in the cross-bed position; introduce one or two fingers into the vagina and palpate the head. Then let an assistant grasp the head through the abdominal wall and try to push it down through the brim. If he succeeds, the induction of labor is not necessary. If in the next trial the head can not be pushed through the brim, labor should be induced at once. Müller's method is the best, but one can sometimes push the head through the brim when the patient is lying in the ordinary semirecumbent position and be sure of doing so without an internal examination.

The cervix frequently dilates slowly or imperfectly, rendering artificial assistance necessary or advisable.

In the second stage allow the head to "mold" at the brim for one hour. If it engages in the brim, allow it to mold for two hours longer, during which time it will probably be pushed through the brim. If delivery has not been accomplished, apply the forceps in accordance with the rule that the second stage should not be allowed to last longer than one to three hours.

If at the end of one hour the head shows no tendency to engage the brim, turn and treat as an ordinary pelvic presentation.

Forceps versus Version in Slightly Contracted Pelvis.—It was formerly generally supposed that the disadvantage of forceps as

compared with version was the bulging of the parietals in the conjugate during traction. Milne Murray and Porter Mathew have shown clearly by certain experiments that such bulging does not take place because the child's head, instead of being a continuous elastic box, is made up of segments which, under pressure, glide under and over one another. It may be admitted that when it is possible to extract a living child version has no advantage over good axis-traction forceps properly applied, and in the interest of the child forceps delivery has some (not "every") advantage. It has been demonstrated that much can now be done with the axis-traction which could not formerly be accomplished with the ordinary long forceps.

It unfortunately happens, however, that the application of the forceps to a head which has not engaged in the brim is exceedingly difficult as well as dangerous in the majority of cases to both mother and child, although such dangers are lessened in the hands of experts who have become skilled by considerable practice. Turning is easier of performance and safer, as a rule, than the high forceps operation, and should be the operation of election when the head is above the brim. When the head has partially engaged, but the greatest diameter of the head is still above the brim, it is not easy to give a fixed rule. If one has waited three hours for the head to mold and finds the head has engaged well, even though not certain as to the position of its greatest diameter, he should apply the forceps and use traction with the patient in Walcher's position.

If in any case the accoucheur has *properly applied* the forceps so that they *hold* and is unable to bring the head down, he should not on any account attempt version. Jardine, who has had a varied and extensive experience in difficult obstetrical cases in the Glasgow Maternity Hospital, tells us that most of the cases of rupture of the uterus have been caused by such procedures.

While the general rule should be to turn when the head has not engaged, there should be certain exceptions. One should not turn when rupture of the uterus is threatening, or when there is tetanic contraction of a uterus from which the waters have long escaped. Under complete anæsthesia, however, the tetanic contraction may wholly or partially disappear. I have turned in a number of cases of shoulder presentation after I found the uterine

walls grip the fœtus very tightly, and have often been surprised at the marked change produced by anæsthesia and the ease with which I accomplished my task.

Mechanical Advantages of Turning.—(1) After turning, the narrower bitemporal diameter is first engaged in the contracted conjugate. (2) The head of the child is shaped like a cone, the narrowest portion being the base of the cranium. After turning, the apex of the cone is brought first into the contracted brim, and can be more easily pulled through than the broader base of the cone can be pushed through by the uterine contractions or pulled through by the forceps. Some obstetricians do not attach much importance to these points.

Dublin method. In flattened pelvis, the true conjugate measuring 4 to 3½ inches, or in generally contracted pelvis measuring 4 to 3¾ inches, the Rotunda obstetricians do not apply the forceps when the head is above the brim. Their choice is between prophylactic version and leaving the head to mold. I do not know their precise rules as to choice between the two. According to Jellett, when they decide to allow the head to mold through the brim of itself the only special assistance they can render is by placing the patient on the correct side. In a generally contracted pelvis, she should lie upon the side at which the posterior fontanelle is, in order to favor its descent. In a flat pelvis, she should lie at first upon the side at which the forehead is, in order to favor the descent of the anterior fontanelle, and as soon as this takes place upon the opposite side to favor the descent of the occiput. With such exceptions they leave the case to Nature until signs of danger to the mother or child appear. In such cases they may apply the forceps. They do not as a rule apply the forceps until the head has passed the site of contraction. In case of failure with forceps, or if the child is dead, they perforate.

There is one very unsatisfactory feature in this line of treatment. It occasionally means craniotomy on a living child. This is the most horrible operation in the whole range of obstetrical surgery, and probably most of us think it should never be performed. The Roman Catholic Church forbids its performance, for which I honor her. If, however, we have left our case to Nature for a considerable time, then applied forceps, but failed to deliver the living child, what are we to do? We may regret that we did not before decide on Cæsarean section. We may now

perform this operation, but the chances for our patient's recovery will have been much lessened on account of our delay. There seems to be a general consensus of opinion now that Cæsarean section should be done before or in the beginning of labor, and not after we have tried other methods, such as version or traction with forceps. Under such circumstances symphysiotomy is considered by some the most suitable operation.

If we are unable to complete delivery after a reasonable trial of the ordinary methods, the child being alive, and advise Cæsarean section or symphysiotomy, and if the patient and her husband refuse consent, what shall we do? In the Rotunda, under such circumstances, they perform craniotomy.

Treatment in the second degree of contraction when the true conjugate measures $3\frac{1}{2}$ to 3 inches. This degree of contraction is, I think, very uncommon in Canada. Many believe that the induction of premature labor is the best treatment if one sees the patient sufficiently early in pregnancy. If one does not see the patient before the advent of labor, the choice lies between version, use of forceps, symphysiotomy, Cæsarean section, and craniotomy. The chances of delivering a child of average size alive either by version or by use of forceps are not good; but the chances of delivering a small child by either method are at least fair. Delivery by either method is possible with a conjugate of $2\frac{3}{4}$ inches if the child is small.

Treatment in the third stage of contraction with a conjugate of 3 to 2 inches. A symphysiotomy is of doubtful utility with a conjugate under 3 inches, but it sometimes gives good results down to $2\frac{3}{4}$ inches. It is not, as a rule, justifiable with a conjugate less than $2\frac{3}{4}$ inches. After symphysiotomy the only alternatives are Cæsarean section or embryotomy.

Treatment in the fourth degree of contraction with a conjugate of 2 inches or less. Cæsarean section is the only justifiable or possible operation. Extraction of even a mutilated child is either impossible or accompanied with serious difficulty and great danger to the mother.

Summary of Rules for Treatment.—*Treatment* in minor degrees of contraction with true conjugate 4 to $3\frac{1}{4}$ inches (10 to 8 cm.).

During Pregnancy. Examine patient every week or ten days during eighth and ninth months to ascertain when the head cannot be pushed into brim. Then induce labor.

During Labor. Perform version as soon as possible and treat as an ordinary breech case; or, allow the head to mold through the brim and let Nature complete the delivery; or, allow head to mold two or three hours and then use forceps.

In second degree of contraction with true conjugate $3\frac{1}{4}$ to 3 inches (8 to 7 cm.): Induce premature labor at end of seventh month; or, perform symphysiotomy; or, perform Cæsarean section; or, perforate if child is dead.

In third degree of contraction with true conjugate 3 to 2 inches (7 to 5 cm.): Perform symphysiotomy (?); or, perform Cæsarean section; or, perforate if child is dead.

In fourth degree of contraction with true conjugate below 2 inches (5 cm.): Perform Cæsarean section.

INJURIES TO CHILD DURING DELIVERY

Caput Succedanæum.—This is simply a serous infiltration of that portion of the presenting part which corresponds to the external os. The lump is largest immediately after birth, and usually disappears in three or four days. It requires no treatment.

Cephalhæmatoma.—This is an effusion of blood between the pericranium and the bone in any part of the vault of the cranium. It occurs about once in two hundred labors. In rare cases the blood is effused under the occipito-frontalis tendon. When the blood is effused under the pericranium, it cannot extend beyond the bone over which the effusion occurs. The swelling is generally found in the situation of the caput succedanæum and is occasionally double. After a time a bony ridge is found round the edge of the swelling. The whole lump sometimes becomes hard and bony. It is distinguished from the caput succedanæum by the fact that it is not present immediately after birth, by its fluctuation, its long persistence, and its limitation to one bone; and from a meningocele, because the latter is situated over a fontanelle or suture and swells when the child cries.

Treatment. Do not interfere with it in any way. Spontaneous cure takes place in from fifteen days to two months in the great majority of cases. If, however, it becomes painful, or persists more than two months and still appears soft, Treeves advises aspiration of the mass and the application of firm pressure. I have never found such interference necessary or advisable.

Depressions of the skull sometimes occur, especially during artificial delivery. They are most frequently produced by the promontory of the sacrum, some other bony prominence, or by the forceps. They are cup-shaped, spoon-shaped, or furrow-shaped, and are most frequently found on the anterior part of the parietal or on the frontal bone.

Treatment. Apply pressure to the head obliquely. The depression will thus disappear quickly sometimes. In other cases the depression gradually disappears in a few days or a few weeks. When the depression does not disappear, but causes serious symptoms, surgical interference becomes necessary.

Fractures of bones are said to be caused sometimes by blows received by the mother before labor. Jardine reports a case of intra-uterine fracture of the skull.

Fracture of the skull occasionally occurs during delivery. When the bone is also depressed, causing injury to the brain or hæmorrhage, the condition becomes very serious and frequently results in death. When there are symptoms of pressure, elevate or trephine the depressed bone.

Fracture of Long Bones.—The long bones which are most frequently fractured are the femur, clavicle, and humerus. Treat in the usual way by the application of plaster or splints.

Injury to Muscles.—Hæmorrhage sometimes occurs in the substance of muscles, especially the sterno-cleido-mastoid, causing a hard lump or hæmatoma. It is apt to occur a few days after birth and usually disappears in a few weeks.

Injury to the Eyes.—In high or mid-forceps delivery one blade usually presses over or near the eye. Generally no injury results, but occasionally the eye is more or less hurt or even destroyed. In a flat pelvis the injury to the eye is sometimes caused by the promontory. Sometimes subconjunctival hæmorrhage or hæmorrhage into the back of the orbit occurs, but is generally soon absorbed. Corneal opacities have not infrequently occurred in the Glasgow Maternity Hospital. Jardine tells us that in most of the cases the opacity cleared up, but there was usually a linear scar left in the vertical axis.

Injury to Nerves.—Pressure of the forceps blade frequently causes injury to the seventh nerve, resulting in facial paralysis. Usually improvement commences in a few hours and the paralysis disappears in a few days. Injury to the brachial plexus is a very

rare event, but cases of such injury through dislocation of the head of the humerus are reported. Another rare form of paralysis of the arm, affecting chiefly the deltoid, biceps, and supinator longus muscles, is known as Duchenne's paralysis.

ABNORMALITIES AND DISEASES OF THE NEW-BORN CHILD

Imperforate Anus.—As before stated, one should always consider the possibility of imperforate anus when examining the new-born child. Sometimes there is a condition akin to imperforate anus, of complete obstruction of the bowel one-half inch above the anus. If the bowels do not move within a few hours after birth, examine the rectum by passing up the little finger.

Treatment. Operate at once. Incise and carefully dissect upward until the blind end of the rectum is reached. Dilate the opening thus made, daily, with a bougie to prevent contraction.

Umbilical hernia in a minor degree is not unusual. It should be treated by the application of a simple pad made of a penny or a piece of sheet lead properly covered, or by a special rubber pad as made by the manufacturers, kept in position by a piece of adhesive plaster or an abdominal bandage.

Umbilical Hæmorrhage.—Apart from hæmorrhage which may occur from insufficient ligation or slipping of the ligature, secondary hæmorrhage occasionally occurs between the fifth and fifteenth day. The supposed causes are syphilis and hæmophilia.

Treatment. In the majority of cases the patient dies because the hæmorrhage cannot be controlled. Use a compress of lint saturated with a styptic tightly applied with adhesive strips; or transfix umbilicus with two needles placed at right angles and surround tightly with a figure-of-eight ligature.

Umbilical vegetations from the floor of the umbilical fossa sometimes appear after the falling of the cord.

Treatment. Cauterize with solid stick of nitrate of silver and apply a dry dressing of boric acid.

Engorgement of the breasts is quite common in infants, and generally appears between the fourth and tenth days after birth. A milky fluid is secreted and can easily be squeezed out, but unfortunately the squeezing-out process is fraught with

danger and not infrequently causes suppuration. Without such squeezing suppuration may occur from septic infection.

Treatment. Be sure to warn the nurse not to squeeze the breasts. Avoid everything that is likely to irritate. Do not allow even rubbing with warm oil, as frequently recommended. Put a pledget of cotton over the breast under the binder for protection. When suppuration occurs incise freely at once.

Jaundice or icterus is very common in early infant life. It generally requires no treatment, although it is perhaps well to give one dose of castor oil or a half grain of gray powder three times a day for six doses. Occasionally a severe form of icterus occurs, caused by or accompanied by occlusion of the bile ducts or syphilitic disease of the liver. It is usually fatal.

Club feet should be carefully looked after by the physician and nurse. The nurse when instructed by the doctor can do much in the way of curing the deformity by straightening the foot and massage of the faulty muscles many times a day. A simple medicated oil, such as a weak menthol liniment, a dram each of chloroform and menthol in four ounces of olive oil, may be used.

Spina bifida is really a spinal meningocele due to a gap in the spine. This is a very serious condition, and should be treated by a skilled surgeon.

Ophthalmia neonatorum is a form of purulent conjunctivitis most frequently caused by gonorrhœa. The symptoms generally appear on the second or third day, but may be present at birth. When the symptoms appear five days or more after birth, they are generally due to infection by attendants. The inflammation is very virulent and frequently causes irreparable damage.

Symptoms. The eyelids become red, and swollen with a copious secretion, at first serous but soon becoming purulent. If prompt treatment is not adopted the eyes are soon destroyed.

Prophylatic Treatment. Employ antiseptic vaginal douches in all cases in which the patients have suspicious discharges. Drop two or three minims of a 2 per cent. solution of nitrate of silver into each eye of the babe after the head is born. Separate the lids before putting in the drops. This is done as a matter of routine in all cases in the Burnside Hospital. We find the nitrate of silver (Credé) more satisfactory than a solution of bichloride 1 to 2,000, or a solution of protargol, 20 per cent. In private practice it is generally sufficient to wash out the eyes with a solution

of boric acid. If, however, there is a vaginal discharge, one should always use one of the strong antiseptic solutions.

Curative Treatment. Obtain the assistance of a skilled oculist *at once* if possible. Wash away the pus with a saturated solution of boric acid, and instil a couple of drops of a solution of silver nitrate every two hours.

Cyanosis is generally caused by some malformation of the heart, such as non-closure of the foramen ovale, or deficiency in the interventricular septum or great vessels, such as the pulmonary artery. As a consequence the blood is deficient in oxygen and has an excess of carbon dioxide. The resulting blueness of the skin is most pronounced over the cheek-bones, nose, lips, and fingers. The action of the heart is rapid and tumultuous; various sorts of bruits are sometimes heard; the respiration is disturbed; evidences of failure of nutrition usually soon appear. Most babes thus affected die within a few months after birth. They may, however, live for years, but always show signs of impaired vitality. The main indication as to treatment is to keep the child as quiet as possible.

Tetanus neonatorum is a rare disease beginning within ten days after birth. After some fretfulness and disinclination to nurse, rigidity of the muscles appears and reaches its maximum in twelve to twenty-four hours. The rigidity generally commences in the masseter muscles; the head is soon thrown back with perhaps opisthotonus, while there is general flexion of the extremities. It is a specific disease due to the invasion of the tetanus bacillus, the seat of infection being most frequently the umbilical wound.

Treatment. Preventive treatment by cleanly management of the cord is the most important consideration. The disease when established is nearly always fatal. The best medicines are chloral and sulphonal by the rectum, one to two grains of the former every hour; three or four grains of the latter every two hours; or the tetanus antitoxin as produced by our leading manufacturing chemists.

Discharge of blood from the vagina occasionally occurs. As a rule, it is not at all serious and ceases in a day or two.

Syphilis.—The infant may show symptoms of syphilis at birth or shortly after birth. The earlier the symptoms appear the worse the attack will be. The symptoms are the ordinary copper-colored eruption, bullæ especially on palms of hands and soles of

feet, coryza, fissures of anus and mouth, emaciation, and evidences of visceral and bone disease.

Treatment. Administration of mercury by the mouth or preferably by inunction.

Erythema intertrigo is a hyperæmic disorder occurring between the thighs and over the buttocks. As a rule there is no infiltration or thickening, and thus it is distinguished from eczema; but sometimes it grows worse and becomes an actual eczema. It is generally due to want of care in changing the napkins and cleansing the parts, but it may occur under the most careful nursing.

Treatment. It is of course important to change the napkins as soon as they become moist and cleanse the parts thoroughly. Use very bland soaps, and remember that too much water often increases the irritation. The best applications are: first, dusting powders; second, lotions; third, ointments.

The best powders are boric acid, talcum, or the old-fashioned baked flour. The following mixture answers well:

℞ Pulveris acidi borici..... ʒ j;
Pulveris zinci oxidi..... ʒ j;
Pulveris talci..... ʒ v.

One of the best lotions is a saturated solution of boric acid. One of the best ointments is cold cream.

Tongue-tie is said to exist when the frenum is too short or comes too far forward. It occasionally prevents the child from sucking, but nothing like so frequently as is supposed by the laity.

Treatment. Place the babe with its head on the nurse's knees toward the surgeon. Raise the tip of the tongue, put the frenum on the stretch with two fingers of the left hand and cut through its thin edge with a sharp pair of scissors, pointing the scissors downward parallel to the ranine veins. Then tear the frenum with the tip of the nail of the forefinger of either hand to an extent sufficient to allow free movement of the tongue. If a free cut is made with the scissors parallel to the base of the tongue, dangerous hæmorrhage may ensue.

Thrush or sprue is the common name of a parasitic stomatitis, the parasite being the oidium albicans or saccharomyces albicans which is identical with the mold of wine. White patches appear in many parts of the mouth, including the tongue, cheeks, and

hard palate, and occasionally the soft palate, pharynx, and perhaps the stomach and intestines.

Treatment. Strict cleanliness in all respects will prevent thrush. When the patches appear, apply the glycerinum acidi borici or a solution of salicylic acid 1 to 250 frequently. The solution of borax and honey so commonly used is objectionable, because the honey tends to increase the growth of the parasite. Indigestion is frequently a complication, and should be treated with half-grain doses of gray powder or teaspoonful doses of castor oil.

Colic is one of the most frequent ailments of infancy. The most common cause is some error in feeding. The most common symptom is an intermittent and loud cry, the infant drawing up its knees during the paroxysm. The babe sometimes cries because of hunger, but such a cry is more constant, less loud, and more like fretting.

Treatment. Observe great care as to food and regularity in feeding. Carminatives, such as peppermint, anise, fennel, gin, whisky, etc., should be avoided. Half a teaspoonful of glycerine to an ounce of warm water may be given, or as much of this mixture as the babe cares to take. A high enema of a pint of warm water through a double rubber cannula or an ordinary enema of a dessertspoonful of glycerine in three ounces of hot water will sometimes have a good effect. One grain of chloral hydrate with ten drops of glycerine and a teaspoonful of warm water will often afford prompt relief. Half-grain doses of gray powder three times a day for two days, or a single teaspoonful dose of castor oil, as recommended for thrush, will often produce good results.

Adherent prepuce and phimosis.—Every male child should be carefully examined the first week after birth to ascertain the condition of the prepuce. There is commonly slight adhesion, and occasionally contraction or phimosis.

Treatment of adhesion. "Strip" the glans and secure, if possible, a prepuce freely movable. The mother or nurse should retract the prepuce and wash the parts daily. If an easily gliding prepuce cannot be obtained on account of phimosis, some cutting operation such as circumcision is necessary. Complete removal of the foreskin, however, leaves a tender, sensitive glans exposed—a condition not generally desirable.

CHAPTER XXIV

OBSTETRICAL OPERATIONS

General Considerations.—The important consideration in all kinds of obstetrical procedures is cleanliness, involving as it does both asepsis and antisepsis. For reasons already given it will be considered that asepsis alone is not sufficient for obstetrical operations, because the parts concerned cannot be made aseptic.

During childbirth our aim is to have the patient clean in every part of her body. She gets her bath and lies on a clean bed. In addition, the vulva and adjacent parts are thoroughly scrubbed with soap and hot water. Nearly all soaps are more or less antiseptic, but green soap, which is the best for such purposes, is strongly so. We then wash with our antiseptic solutions. We consider for obstetrical purposes that the corrosive sublimate solution answers admirably for this external cleansing, and that lysol solutions and iodoform gauze are better suited for the utero-vaginal canal; or, if we are limited to one antiseptic, we choose lysol as the one that is suitable and efficacious in all sorts of obstetrical procedure.

We endeavor to have our hands, instruments, and all the surroundings absolutely clean. Under such circumstances we dilate the cervix, apply the forceps, perform internal version, deliver the placenta manually, etc., without any further attempts at asepsis or antisepsis. At this point we differ to some extent. Many think that in most forceps deliveries, and in all cases where the hand has been introduced into the uterus, an intra-uterine douche is advisable. Others think that such an intra-uterine douche is generally harmful to some extent, and that it is unnecessary if a clean hand has been used. The gynæcologist, as a rule, will not perform any operation on the vagina or uterus without endeavoring to make the whole field, including the vagina, absolutely free from organisms, so far as such can be accomplished. There is a certain class of obstetrical operations in which the rules of the gynæcologist are advisable. It may be well to refer to

some notes of warning given by the gynæcologists which are of equal importance to obstetricians under all circumstances.

The nurse may inadvertently convey septic matter to the patient. One should never consider that a nurse is surgically clean until he has proved her to be so, no matter through what training school she has passed. I witnessed a very important operation not long since, when one of our best surgeons did his work in a very skilful and cleanly way. He was assisted by two surgeons and two nurses, I being simply an onlooker. One of the nurses happened to make three or four mistakes. She pushed up her left sleeve once with her right hand when it was not surgically clean; she allowed surgical dressings to touch the same sleeve twice; she touched a chair at another time after she had carefully washed her hands and had commenced to handle the dressings. Such mistakes are not small—they are wofully and terribly large. The patient died of septicæmia. I cannot say that the nurse referred to (a very worthy and conscientious woman) was responsible for the poisoning; but I know the operation was not aseptic, while the surgeon-in-chief thought it was.

It is to be feared that both general surgeons and obstetricians still make many mistakes about these supposed small matters. They know, perhaps, that it is not safe to take a needle and thread from the floor and use them, but they frequently do not know how to sterilize the same piece of thread. In some cases they think that, after soaking it for a few minutes in a 2 or 3 per cent. solution of lysol, or a couple of minutes in boiling water, it will be sterile. Certain germs, and especially certain spores, will not be thus destroyed.

In all operations involving the invasion of the vagina during pregnancy, such as induction of abortion, removal of blighted ovum, curettement in inevitable abortion, induction of premature labor, etc., it is better to prepare the vagina as for a vaginal hysterectomy. Such preparation is probably advisable, even though it be considered that in the great majority of cases the vagina is practically sterile. It may be considered sterile in a sense because it contains no pathogenic cocci, and therefore nothing which can produce septicæmia. It does, however, contain bacteria, which produce putrefaction under certain circumstances (see page 366). I fear these bacteria in operative work before and after labor, but I generally disregard them during labor.

Preparation of Patient.—For any operation on the genital organs during pregnancy, commence to prepare the patient one or two days before the operation. It is better to have the preparation made by or under the supervision of a nurse. On the day before operating give her a purgative before breakfast, and administer an enema about eight or nine o'clock in the evening. Give her a bath about one hour after, scrubbing her well, using soap and fairly hot water. Put her in bed and as soon as convenient administer a vaginal douche, using a gallon or two of fairly hot lysol solution 1 per cent. On the morning of the operation administer another enema of warm boric solution 3 per cent., three or four hours before the operation. As soon after this as convenient, shave or cut closely with scissors sufficient hair from the labia majora and mons veneris to give clear space for operation. Wash the pubic, peritoneal, and anal regions and the inner surfaces of the thighs with soap (preferably green soap) and hot water, and finally a hot solution of lysol 1 or 2 per cent. The nurse may then apply a vulvar pad soaked in a 1 to 100 lysol solution or a 1 to 2,000 bichloride solution. When the operator arrives he should first prepare himself, arrange his instruments which have been sterilized, and see that the nurse has completed her preparations. Then see that the bladder is empty. After the bladder is emptied rinse the hands in the lysol solution which is in a basin close at hand. Then wash vulva and adjacent parts as was formerly done by the nurse. Then scrub the vagina with green soap and hot water, using a piece of absorbent cotton as a mop. Then douche thoroughly with lysol solution. The patient is now prepared for the operation.

Sterilizing of Instruments.—Various forms of sterilizing chambers are in use, some of which are very good, while others are of doubtful utility and difficult to manage. Fortunately, they are not required, as we can thoroughly sterilize our instruments, appliances, ligatures, etc., by keeping them in boiling water for fifteen minutes. A small teaspoonful of common salt and half a teaspoonful of sodium carbonate should be added to each pint of water. After the instruments are sterilized they should be placed in a 1 per cent. solution of lysol or in plain sterilized water.

As the boiling dulls the edges of sharp instruments and the points of needles, I prefer to sterilize knives, scissors, needles, etc., by first washing in soap and water or warm lysol solution, then im-

mersing in pure lysol for five minutes, and then placing them in lysol solution 1 per cent. or sterile water.

GENERAL OPERATIONS

Sutures.—Most of the wounds caused during parturition should be sutured. Asepsis and antisepsis have made the modern suture absolutely safe. In obstetrical surgery, silk, silkworm gut, catgut, kangaroo tendon, and silver wire are used. We can easily sterilize our silk, silkworm gut, kangaroo tendon, and silver wire, but it is more difficult to sterilize the catgut. It is better to have it absolutely sterile and at the same time sufficiently antiseptic to make it unfit as a culture medium for pathogenic microbes. The kangaroo tendon is suitable for cases in which the catgut is used, and some say safer, because the tendon can be easily sterilized and is less susceptible to infection than the catgut. The silk is tied in a reef knot or a surgeon's knot, silkworm gut in a surgeon's knot, kangaroo tendon in a reef knot, catgut in a triple reef knot, silver wire is twisted.

Hypodermic Injection.—This small operation may seem insignificant, and yet it is sometimes followed by serious consequences. A few years ago one of our students had serious septicæmia from the use of a hypodermic syringe. Senn reports a very distressing case. The father of a young, promising physician suffered from a painful but not serious affection. The son made a hypodermic injection of morphine. The patient died in a few days from acute sepsis, which had its starting-point at the seat of puncture. The needle had not been sterilized. Hypodermic needles and trocars should always be sterilized by keeping them fifteen minutes in boiling soda solution. Do not pass them through a flame or dip them in lysol solution. The boiling process is the only safe procedure. Thoroughly cleanse the seat of puncture before introducing the needle. This can be done with soap and water; but it is safer to also clean the skin with turpentine or lysol solution.

Subcutaneous Injections of Salt Solutions.—Add a teaspoonful each of common salt and acetate of soda to a pint of sterilized water raised to a temperature of 100° F. Various forms of apparatus have been invented, but the simplest way is to use an aspirating needle attached to a rubber tube having a funnel or fountain of some sort at the upper end. Clean thoroughly the seat of puncture,

as before described. Make a small incision in the skin with a scalpel and push in the needle while the water is running through it, to prevent the injection of air. The injections are most commonly made behind the mammary gland.

High Rectal Enemata.—Add a teaspoonful each of salt and acetate of soda to a pint of warm water. Use a fountain syringe with a large gum-elastic catheter as a nozzle. Pass the catheter about eight or nine inches up the bowel. This should be done very gently, as the sphincter ani is frequently very irritable and some patients object seriously to the procedure. Most people can retain 12 to 16 ounces. Absorption as a rule takes place quickly.

Prolonged irrigation of the bowel with a hot salt solution (temperature 120° F.) is sometimes done, as already mentioned. For this a double-current cannula is employed and several gallons of solution are used.

Intravenous Injection of Salt Solution.—In this procedure the saline infusion (common-salt-sodium-acetate solution) is injected directly into the vein. The apparatus employed may be the same as that for subcutaneous injection, a small cannula taking the place of the needle. Cleanse the skin over the median basilic vein. Put a snug bandage round the arm below the shoulder. Make an incision one inch long parallel with and close to the vein. Free the vein from its attachment for half an inch with the handle of the scalpel. Introduce beneath the vein an aneurism needle threaded with a double silk ligature. Cut the ligature, retain both strands in position, and remove the needle. Draw one of the ligatures into the lower angle of the wound and ligate the vein. Draw the other ligature into the upper angle of the wound and tie loosely one-half of a reef knot. Pick up the vein with a pair of dissecting forceps and make an oblique upward slit with scissors, taking care to cut through the entire caliber of the vein. Pass the cannula, with the solution running through it, quickly into the vein. Remove the bandage from the arm. Then draw tightly the half knot round the vein and cannula. Hold the funnel or *fountain* about three feet above the vein and introduce one or two pints of the solution. Then withdraw the cannula, tighten the ligature and complete the reef knot. Cut ends of both ligatures close to the knots. Divide the vein completely between the ligatures, close the skin incision by two or three sutures, and apply a suitable dressing.

Catheterization is always dangerous, because it may cause a troublesome or incurable cystitis. It is sometimes a very difficult operation to perform during labor and after labor. During labor the difficulty is generally produced by the pressure of the presenting part on the urethra; after labor, by the distortion due to bruising and tearing.

Choice of Catheter. A soft-rubber catheter (Nos. 10 to 12, English) is generally preferred. It is not easy to sterilize such an instrument. If it becomes septic, or if there is reason to suspect that it has, do not try. Have a clean new rubber catheter in the satchel. Before using it wash it with soap and warm water, and leave it for a time in 5 per cent. solution of lysol. After using it wash it again with soap and water, then use a soda solution, and finally leave it in a 2 per cent. solution of lysol or a 1 to 2,000 solution of bichloride until wanted again for the same patient. When it is no longer required for this patient, destroy it. Never use a soft-rubber or a gum-elastic catheter on a second patient. As the parts are very sensitive, it is occasionally advisable to administer an anæsthetic. I saw not long ago, with Dr. Herbert Hamilton, a patient who had retention of urine after labor. Each of us endeavored to pass a soft-rubber catheter and failed. We could pass it in about an inch, but no farther. We then introduced a glass catheter without much trouble. It is well to carry both a rubber and a glass or metallic catheter in the satchel. The patient is placed in the lithotomy position with knees widely separated, as this puts the vestibule on a stretch and generally brings the meatus within easy reach. Never attempt to pass a catheter after labor by the sense of touch under the clothing, but always expose the parts thoroughly in the best possible light. The legs and thighs should at the same time be covered as well as possible.

Operation. First wash external parts. Then separate the labia with two fingers of the left hand, so as to bring the meatus into view. Cleanse thoroughly with a pledget of cotton soaked in warm lysol solution, or use a douche with same solution. Take the clean catheter from the warm solution, pass it into the meatus and gently push it along the urethra into the bladder. When during labor the presenting part is wedged low down in the pelvis, place two fingers of one hand on this head or breech, as the case may be, and push it up out of the pelvis until the catheter is passed into the bladder with the other hand. If this fails, place

the patient in the knee-chest position, which will cause the fœtus to gravitate away or allow it to be pushed away from the pelvis, when the catheter can be pushed into the bladder.

The Douche.—Three kinds of douche are recognized: vulvar, vaginal, and uterine.

Vulvar Douche. The patient is placed on her back as described for catheterization. Bring nates to or slightly beyond the edge of bed. Place under the buttocks a Kelly pad or a piece of mackintosh or oilcloth so arranged that the water as it runs away will be carried to a slop-pail under the edge of the bed. Use an ordinary vulcanite or glass nozzle on the end of a tube running from a fountain. Turn the stream first on external part of vulva and adjacent parts. Then separate the vulva with two fingers and direct the stream to parts between them.

Vaginal Douche. In all cases the vulvar should precede the vaginal douche. The nozzle and its openings should be sufficiently large to allow a good flow. A double catheter—i. e., one with one tube for the in and the other for the outflow—is not necessary. Most of these found on the market are too small for good work. The best kind of nozzle is made of glass, but it is so easily broken that many prefer one made of vulcanite. The only objection to the latter is that boiling water soon spoils it. A metallic nozzle is suitable in many cases, but not for a very hot douche, because the metal, being a good conductor of heat, becomes hotter than the patient can bear. The openings in the nozzle should be slits, not round holes, and situated at the sides, never at the end. A nozzle with a hole in the end is more convenient for douching the external part of the vulva and adjacent parts, but one prefers as a rule to complete the procedure without changing nozzles. For purely external douching the nozzle with the slits at the sides may require to be turned sidewise, or the solution may be poured over the vulva from an ordinary pitcher. After this, separate the labia as before described, place the end of the nozzle just within the vagina, and the flow from the side slits will accomplish what we want.

The patient has been placed in proper position for the vulvar douche. Keep her in the same position and introduce the nozzle well into the vagina. While doing so also introduce two fingers into the vagina and separate so as to insure a good outflow. Or the two fingers may be first passed into the vagina, then separated, and nozzle passed between them.

Uterine Douche. It has been stated that an intra-uterine douche, no matter how carefully administered, is frequently followed by serious results; and one can readily understand that when carelessly administered it is likely to be followed by still more serious results. Two points in connection with the intra-uterine douche should ever be kept in view: (1) unskilful, and even skilful, administration is frequently dangerous; (2) when skilful administration is not dangerous it is frequently useless. The dangers are supposed to arise from shock, forcing fluid or air through the Fallopian tubes into the peritoneal cavity, dislodgment of clots from the placental site causing hæmorrhage, allowing the entrance of fluid or air into the sinuses, or poisoning from the absorption of the antiseptic, especially when corrosive sublimate is used. Shock was the apparent cause in most of the cases that I have observed. Why shock should be caused by the introduction of hot water into the uterine cavity, when a free outflow is allowed, I do not know. Intra-uterine injections of hot water soon after labor, as for post-partum hæmorrhage, appear to cause less serious results than those administered some days after labor, as for septicæmia. I have had no experience of a case where death has been caused by air embolism induced by a douche. Such cases, however, have been reported.

Operation. Both the vulvar and the vaginal should precede the intra-uterine douche. Introduce the large-sized nozzle such as has been described, and endeavor to pass it up to the fundus. In order to do this the nozzle should be long and have a pelvic curve. It is also especially important that the tube should be large enough to allow a full-sized stream to pass through. In order to pass the nozzle with certainty up to the fundus of the anteflexed uterus it is necessary to employ some means to straighten the uterine canal and bring its axis more in line with the vagina, as pointed out by Chalmers Cameron. To accomplish it, seize the anterior lip of the cervix with a pair of blunt bullet forceps and draw it gently downward. Be sure that the water is passing through the tube before the nozzle is passed into the uterus. Let the assistant pull on the handle of the bullet forceps while the operator places one hand like a cap over the fundus and occasionally presses on the uterus through the abdominal wall so as to expel all fluids, clots, and débris of every kind. The slight traction on the anterior lip generally keeps the cervix

sufficiently open, and should be continued after the nozzle is withdrawn until all the fluids and débris are pressed out of the uterine cavity by the hand over the fundus. If corrosive sublimate has been used, some plain hot water should always be injected to wash out or dilute any of the solution that may be retained in either the vagina or uterus after vaginal or uterine douches. One should keep in view the fact that some patients are very susceptible to its evil effects, and also keep in mind the ordinary symptoms of mercurial poisoning. They are diarrhœa with tenesmus, and occasionally blood and mucus in the stools, abdominal pains, sore gums, loosening of teeth, salivation, metallic taste, occasionally vomiting.

Curettage.—The use of any metallic curette is seldom advisable in obstetrical practice. In severe cases of septicæmia, especially in streptococcic infection, it should never be used, for reasons which have already been given. It may be used occasionally with advantage for inevitable abortion during the first ten weeks of pregnancy. It may also be used occasionally for that form of hæmorrhage which continues for a long time after labor, due to subinvolution or for secondary post-partum hæmorrhage, as before mentioned.

Curettage for Early Incomplete Abortion. Prepare the patient by cleansing vulva and vagina. If cervix is not sufficiently dilated, introduce if possible a cervical and vaginal tampon, or dilate with a suitable dilator. The ordinary tents are more or less dangerous. The best position for the patient is on the side (Sims), especially when vaginal tamponage is done, or on the back, especially when a dilator is used for the cervical canal. If the finger cannot be introduced into the uterine cavity, seize the anterior lip of the cervix with volsella or bullet forceps, draw it down gently. Let an assistant seize the handle of the forceps and make steady traction, while the dull curette is passed into the uterus with one hand and the other hand is placed over the fundus so as to ascertain when the instrument has reached the top of the uterine cavity. When this has been accomplished the forceps may be held in one hand, while the curette is used with the other. Scrape the interior of the uterus methodically; first, the anterior surface; second, the left side; third, the posterior surface; fourth, the right side; fifth, the right cornu; sixth, the left cornu. In curetting, always push upward gently (Dührssen), but scrape

downward with a certain amount of force. One is more apt to perforate the uterine wall in pushing upward than in scraping downward. Such perforation with a clean instrument does no great damage in the majority of instances, but its occurrence is a very serious matter when curetting for incomplete abortion with septicæmia or sapræmia. It is certainly an unpleasant accident in any case. If the instrument suddenly passes into something like empty space, it may be a question whether the uterine wall has been perforated or the instrument has been pushed into one of the Fallopian tubes. Generally, however, the uterine wall has been perforated. After scraping, give an intra-uterine douche of hot salt solution, using a double cannula or some form of nozzle which will insure ample return flow. Anæsthesia is generally advisable but not always necessary for this operation. If a metallic instrument is considered necessary a dull curette with a somewhat flexible stem should be used. I know of none better than Thomas's dull wire curette, which consists practically of a copper wire with a small loop at its extremity.

Materials for vaginal, cervical, and uterine tampons are strips of iodoform gauze, iodoform cotton, iodoform linen (more correctly, iodoformed), or strips lysoled, borated, or carbonated—all being previously sterilized. Pledgets or balls of absorbent cotton or wool properly medicated may also be used. Dührssen frequently uses a combination of iodoform gauze and salicylic wool for one tamponade. One long strip is better than a number of separate pledgets or balls, because the one strip can be removed more easily and the removal causes less pain. One has only to seize the end of the strip and pull it out slowly, while with a large number of pledgets one has to search for them and remove them separately. The latter objection may be removed, however, by attaching them to a single string about six inches apart, forming the so-called *kite-tail*.

Tamponade.—The use of the tampon has been frequently referred to in other chapters. The chief varieties of tamponades are vulvar, vaginal, cervical, and uterine.

The *vulvar* tampon or the vulvar pad is used to control hæmorrhage from the vulva, especially that due to ruptured labial thrombus or varix. When clots are present, remove them; if there is a cavity, pack it with iodoform gauze; if necessary, tamponade the vagina as well; put a pad over vulva, hold in position by a

T-bandage tightly applied. This T-bandage is applied by passing a fairly broad bandage (about three inches) around the waist and fastening the ends in front. Another piece of bandage stitched to the center behind is brought forward between the thighs over the vulva pad and fastened to the waist bandage in front of the pubes.

Vaginal Tamponade. Prepare the parts. See that the bladder and rectum are empty. Place patient in Sims's position. The upper half of the vagina should be ballooned as much as possible, in order to enable one to introduce enough material to properly control hæmorrhage or cause dilatation of cervix, or both. The dorsal position is quite suitable for uterine curettage, or even for uterine tamponade, but never for efficient vaginal tamponade. Introduce a Sims's speculum, and let an assistant hold it in position in such a way as to pull back the perinæum and the posterior vaginal wall. A valvular speculum may be used, but nothing answers so well as a Sims's, especially when there is an assistant. One can manage by using one or two fingers to retract the perinæum, as recommended by Shauta; or an imitation of Sims's speculum may be improvised by bending the handle of a dessert-spoon to a right angle close to the spoon.

Take the end of the strip in a dressing forceps and first pack the posterior vaginal vault, then left of cervix, then anterior vaginal vault, then right of cervix, then against os. Continue to pack as tightly as possible until about two-thirds of the vagina has been filled. A dilated or ballooned vagina is like an inverted funnel, and one should endeavor to fill the cone but not the pipe or mouth of the funnel. The entrance to the vagina is like the short pipe of the funnel and should not be tightly packed so as to put it on the stretch, because this causes great pain and frequently retention of urine. If the very dilatable vault is properly packed it is seldom, perhaps never, necessary to pack the entrance. It is better to have the material moistened by antiseptic solution, preferably lysol, especially the first half of the tampon. This is particularly important when using iodoform gauze, because it makes more certain the antiseptic action of the iodoform, which is inert if perfectly dry. The wet strip or pledgets can also be packed more firmly than the dry material. The soapy lysol also tends to prevent irritation of the vagina and make the tampon more easy to remove. The simplest plan is to have the long strip or kite-tail in a bottle

with a proper cover. Let an assistant remove the cover and hold the bottle while the end of the strip or kite-tail is seized with the forceps and passed directly into the vagina. It is convenient to moisten the strip by pulling a few feet out of the bottle and placing the portion removed in a basin containing a 1 per cent. warm lysol solution. Then remove from basin, squeeze well, and place on sterile towel close to patient's nates. Then introduce the strip thus moistened into the vagina.

An iodoform tampon may be left in the vagina from one to two days, or more if necessary; a lysol tampon twenty to twenty-four hours; an aseptic tampon eight to ten hours. An iodoform tampon which has been also lysoled will, as a rule, cause little or no irritation. After removal a second may be introduced at once if advisable. A third and a fourth may be introduced without causing much irritation or any septic infection.

Intra-uterine Tamponade. Place patient in the cross-bed position on her back. See that the bladder and rectum are empty, and remove all clots, membranes, etc., from cavity of the uterus. Seize anterior and posterior lips of the cervix with two volsellæ and draw the os uteri down to the vulva or as near it as possible. Let an assistant hold the handles of the volsellæ. Introduce the strip of iodoform gauze directly from the bottle (as described for vaginal tampon) into the uterine cavity with a long dressing forceps or some form of gauze packer. Place one hand over the uterus to ascertain when the fundus has been reached. Gradually fill the uterus tightly from fundus downward. Sometimes the volsella may be dispensed with if the uterus is carefully pressed into the pelvis by an assistant with hand over fundus. Or the whole hand may be passed into the uterus and the gauze pulled in and packed by it. After the cavity has been filled remove the volsella (if used) and loosely pack the vagina with the gauze while the patient is still on her back. When it is considered necessary to tampon the vagina tightly, turn the patient and place her in Sims's position; or the whole utero-vaginal tamponade may be done with the patient in the Sims's position. Remember the objection to the gauze on account of its penetrability, and for severe hæmorrhages use the medicated cotton wool plugs, especially in the vagina. If the bleeding still continues, notwithstanding combined gauze and wool tamponade, on account of atony of the uterine wall, compress the uterus from without against the

tampon. Sometimes the tampon stops the hæmorrhage for a time, but after the occurrence of strong uterine contractions bleeding commences afresh. In such cases the blood is usually being squeezed through the plug, and the latter should be at once removed.

Episiotomy.—It is thought that one or two clean incisions may prevent rupture of the perinæum. Make each cut backward and outward from the side of the fourchette toward the tuber ischii. After delivery suture the cuts. I know of no prominent obstetrician in Great Britain or America who approves of episiotomy.

Repair of Lacerations of the Genital Canal.—We have learned, chiefly from obstetricians of the United States, the vast importance of the pelvic floor from an obstetrical point of view. We now know that the perinæum—i. e., the triangular body situated between the vagina and the rectum—is a structure of but little importance when compared with the pelvic floor. The student learns in the dissecting-room that this pelvic floor is composed chiefly of muscle and fascia, so arranged as to give the structure considerable sphincteric and great supporting power. It is probable that the principal supporting power is furnished by the different layers of fascia. We should, however, consider that all structures, including both muscles and fascia, are of the greatest importance, and when torn should be restored as nearly as possible to their original relations and conditions.

Commencing from above and going downward, the most serious injuries are lacerations of the body of the uterus (generally the lower segment), cervix, vagina, pelvic floor, perinæum, and various parts of the vulva. It is the duty of the obstetrician to consider carefully and treat properly all such lacerations. There is another class of injuries which the obstetrician should ever bear in mind—necroses and sloughs of tissues, generally produced by long-continued pressure of the presenting part of the child, resulting in various forms of fistulæ. He should endeavor to prevent such accidents, and thus avoid the humiliation of giving his patient into the hands of the gynæcologists for after-treatment.

Lacerations of the Cervix.—Obstetricians have differed much in the past as to the proper treatment of lacerations of the cervix. It is now, however, generally believed that in the great majority of cases such lacerations should be left alone. Nature can care

for the ordinary small lacerations better, as a rule, than the obstetrician. If there is considerable tearing of the vagina or copious hæmorrhage with contracted uterus, one should suspect serious laceration of the cervix and ascertain the condition by vaginal examination, using a speculum if necessary. When a deep laceration is found the primary suture is advisable.

Operation. Immediate operation should be performed when the indication is to stop hæmorrhage. An anæsthetic is generally unnecessary, as the cervix is not sensitive. Place patient on back in the cross-bed position with nates well over edge of bed. Wash vulva and adjacent parts, but do not administer a vaginal douche. Retract perinæum with a large Sims's speculum or a Garrigues's weight speculum. Keep the anterior wall of the vagina out of the way with a retractor if necessary. Pull down the cervix with a single volsella; hold the two lips of the wound in contact with the volsella, one point being in each lip near the lower end of the tear. Introduce the first suture on a level with or just above the upper angle of the tear and tie at once. This should control the bleeding. Then introduce one, two, or three more sutures if required. Kangaroo tendon or catgut is the best suture for this operation. It holds sufficiently long to allow union, and it pleases the patient much to be told that no stitches will require removal. The catgut should be taken with a clean pair of forceps from the bottle in which it is kept in alcohol and placed on a sterile towel or plate, because if placed in a lysol solution or in sterilized water it will swell to such an extent that it cannot be threaded in an ordinary needle. It is also convenient to place the kangaroo tendon on a sterile towel, but its retention for a limited time in a sterile or antiseptic solution will not cause swelling.

Lacerations of the Vagina.—There may be lacerations of the vagina, especially in the upper part, which do not involve the pelvic floor. Such a laceration is frequently continuous with the tear of the cervix. This should be sutured immediately after the repair of the cervical laceration. Generally it is more convenient to use rather short needles well curved. A Hagedorn needle is suitable, but the ordinary curved needle held in a needle-holder is satisfactory.

LACERATIONS OF THE PELVIC FLOOR AND PERINÆUM

Either of these structures may be injured without the other, but in serious tears both are generally involved. As a matter of convenience we may consider four varieties: (1) Laceration of the pelvic floor and fourchette; (2) laceration of the perineal body; (3) laceration of the pelvic floor and perineal body, but not including the sphincter ani; (4) laceration of the pelvic floor and the perineal body extending into the rectum. It is stated that lacerations of the pelvic floor occur in 35 per cent. of first and 10 per cent. of subsequent labors. I think those who use the axis-traction forceps with care have a smaller proportion.

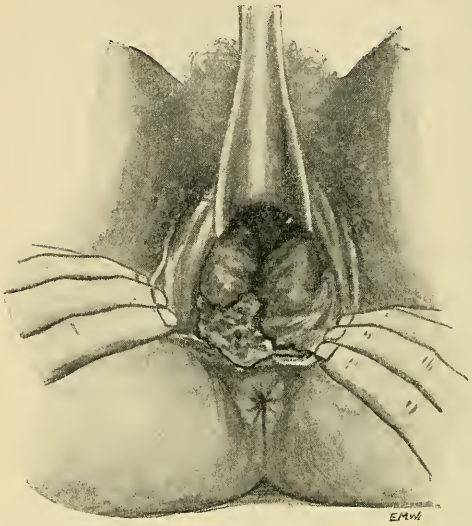


FIG. 168. — LARGE TEAR ON RIGHT SIDE OF PELVIC FLOOR.

Showing triangular raw surface from slight tear involving only mucous membrane running to left, also slight tear of skin and body of perinæum. (Burnside Lying-in Hospital.)

When should the operation be performed? When I first took charge of the Burnside Lying-in Hospital it was supposed that anybody could "stitch a torn perinæum," and the members of the intern staff were in the habit of performing immediate operation, suturing the perineal tear without any regard to lacerations of the pelvic floor, and at the same time being careless in some cases as to asepsis or antisepsis. One patient thus treated died from puerperal sepsis. Orders were then issued that no such operation was to be performed excepting by or under the direction of a member of the visiting staff. We found that the patient might be left a considerable time after the completion of labor before operation was necessary, although we seldom waited more than twenty-four hours. In 1894 a patient had extensive laceration of the

perineal body, which was sutured shortly after labor. We suspected non-union, and our suspicions were correct, as we found on removal of sutures in eight days. On the tenth day we found two clean granulating surfaces. Sutures were again introduced by Dr. Field, house surgeon, without freshening the wound surfaces, and good union resulted. It is better, however, to vivify granulation surfaces by scraping gently with the sharp edge of a scalpel drawn sidewise, or, some say, by rubbing them with a fold of cheese cloth. I have found that after serious lacerations one is likely to do better work by waiting until he can get good light and make full preparations. Immediately after labor patients who have severe lacerations are usually exhausted and not in good condition to be anæsthetized. The obstetrician has many things

Fig. 169.—Large Bilateral Tear of Pelvic Floor, Running up Each Side of Median Raphé and Slight Tear of the Perineal Body.

(Burnside Lying-in Hospital.)

to think about in connection with the care of the babe and the mother, who has probably more or less inertia uteri. Under such circumstances even a competent and careful operator can scarcely do his best work. It is much better to wait one, two, or three days, when thorough and careful work can be done.

I happened to be asked to give an opinion on a case interesting

from a medico-legal standpoint. Dr. A. attended Mrs. B. in a very difficult and prolonged labor. There was extensive laceration of the perineal body extending to the rectum, and two tears running up the vagina as far as the Doctor could see. The patient was exhausted. On the following day Dr. C. was called in consultation and performed a very difficult and tedious operation, more than thirty sutures being required. The result was good, the parts were restored and healing by first intention took place. Dr. C. rendered a separate account for the operation. Mr. B. objected, because he had been told that it was the duty of the obstetrician to "stitch" such tears immediately after labor, and not to wait until the next day and have a separate operation with an additional fee. I of course expressed the opinion that Dr. A. was right in every respect, and I think Mrs. B. was extremely fortunate in passing into such good hands.

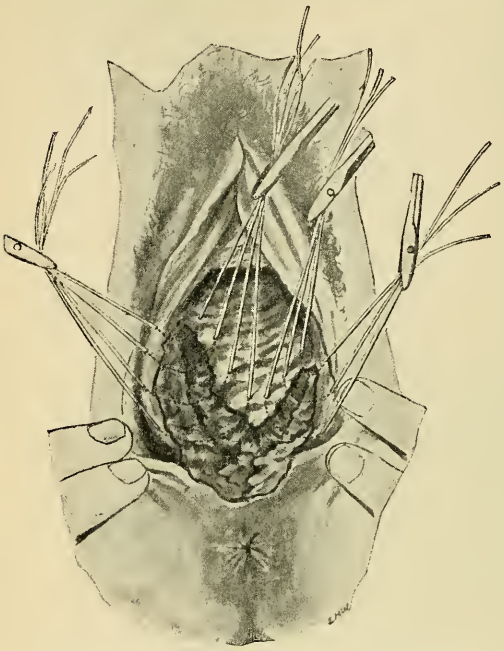


FIG. 170.—SUTURES INTRODUCED INTO THE TEARS OF THE PELVIC FLOOR WITHOUT REGARD TO THE PERINEAL BODY.

I recently attended a slight, small woman in labor. The pelvic measurements were nearly normal. Labor somewhat slow, but fairly satisfactory until the end of the first stage—first vertex position favorable in all respects. Axis-traction forceps easily applied. Slow, easy extraction. While the head was coming through the vulva I noticed slight laceration of the perineal body, just sufficient to require one or two sutures. I found one tear extending upward along left posterior wall of the vagina. I did not know how far, but I thought only a short distance. The

patient was exhausted, and there was a slight post-partum hæmorrhage requiring careful attention. On examination next day I found considerable laceration of the pelvic floor and sent for Dr. McIlwraith, who administered an anæsthetic while I introduced the necessary sutures. Without a careful examination I would have thought there was only a slight tear of the perineal body requiring two sutures, instead of a much more extensive laceration requiring ten sutures.

The important lesson from these cases is this: Dr. A. and I, by simply introducing sutures through the skin at edges of the torn perinæum, as was formerly (if not now) frequently done, might have got a certain amount of union with an apparently restored perinæum. As a matter of fact, the best result we could obtain by such faulty operation would be a ribbon-like bit of skin between the vulva and anus, with the pelvic floor destroyed and a woman crippled for all time.

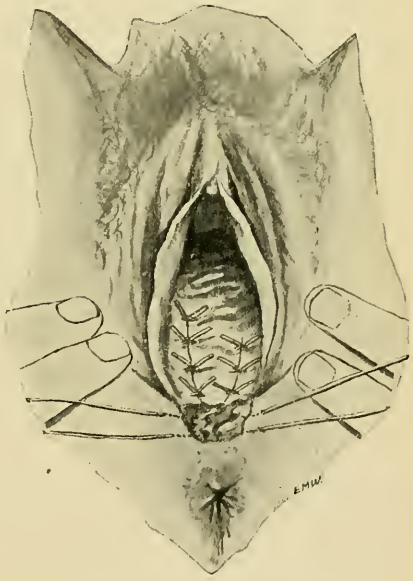


Fig. 171.—Sutures in Pelvic Floor Tied and Two Buried Sutures Introduced into Perineal Tear.

Repair of Laceration of Perineal Body.—Minor injuries of the perineal body or fourchette should, however, as a rule, be repaired at once without anæsthetic. If one uses a sharp needle and thrusts it through the skin quickly with a *jab*, the patient will not suffer much. Such sutures may be introduced, but not tied, before the expulsion of the placenta. After the expulsion of the placenta tie the sutures sufficiently tight to coapt the surfaces without constricting the tissues. It has been well said (by I forget whom) that "a ligature placed for the arrest of hæmorrhage can hardly be drawn too tightly, but when its purpose is to approximate surfaces, and especially skin, we must remember that after

simple coaptation is effected we can do nothing but injury in using any greater degree of tension."

Repair of Laceration of the Pelvic Floor and Perineal Body, but not including the Sphincter Ani.—*Operation.* Place the patient on her back in a cross-bed position, with legs supported by a

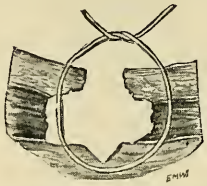


FIG. 172.—SUTURE IMPROPERLY INTRODUCED, DOES NOT INCLUDE MUSCLE ON LEFT SIDE.

FIG. 173.—FAULT ON LEFT SIDE AFTER TYING.

leg-holder or by an assistant. Anæsthesia is generally necessary, chloroform or ether being used. The instruments and sutures required are needle-holder, needles, flat retractors, scissors curved on the flat, strands of silkworm gut in sterilized water, strands of catgut or kangaroo tendon. Some prefer a handled or perineal needle, while others use curved needles threaded with carriers. It is more convenient to use the needle with carrier for introducing the sutures within the vagina, if catgut or tendon is used. For sutures through skin, introduce straight or slightly curved needles threaded with the silkworm gut. Let the assistant separate the

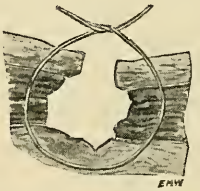


FIG. 174.—SUTURE PROPERLY INTRODUCED, INCLUDING ALL TORN TISSUES.

FIG. 175.—CORRECT RESULT.

vulva and hold upward the anterior wall of the vagina, if necessary, so as to give a good view of the posterior wall of the vagina. It is generally advisable to pack the vagina above the tear with iodoform or sterilized gauze or absorbent cotton, to prevent the discharges from obscuring the view. There will probably be two

tears within the vagina continuous with the single tear of the perineal body. These two vaginal tears run upward, one on each side of the median line, but one usually running higher than the other. The three tears form an irregular Y. Introduce the first suture on a level with the upper angle of the higher tear, about $\frac{1}{4}$ to $\frac{1}{3}$ inch from its margin. After pushing the needle through the mucous membrane, keep the point well outward so as to catch all the tissues (muscles and fasciæ) which have been torn. While doing this make the needle go as deeply as possible without entering the rectum. Then turn the point inward and bring it out at the center of the tear. Re-enter it into the tissue and try to include all the torn structures, and push it through the mucous membrane on the opposite side at a point corresponding to that of entrance. Then let the assistant hold the ends of the sutures or include them in clip forceps. Some pass these sutures at right angles to the vaginal axis. I think, however, that the method recommended by Kelly and Robb is better—i. e., pass the needle through the tissues rather deeply and then in a direction toward yourself or downward, so that the suture at the floor of the tear will be fully $\frac{1}{2}$ inch (Robb says 1 inch) lower than the points of entrance and exit. To introduce the intra-vaginal sutures properly, and especially to avoid entering the rectum, I think it is better to introduce one forefinger into the rectum. One cannot be sure in any case that the rectum is aseptic, and should always consider that the finger after entrance in the rectum is septic. Introduce the remaining sutures in a similar manner in both tears at intervals of $\frac{1}{3}$ to $\frac{1}{2}$ inch until the lower end of the vagina is reached. The finger may be kept in the rectum until all the vaginal sutures are introduced. Then withdraw the finger from the rectum and wash it thoroughly. Tie the sutures in the order of their insertion (not too tightly, as before mentioned). The

Fig. 176.—Two Sutures in Perinæum Tied, and a Superficial Introduced between them and Tied.

difficult part of the operation is now completed. The tear of the perinæum is reduced to a small cavity, which can be closed by sutures introduced through the margins of the skin deep enough to go to the bottom of the cavity, carried transversely across and out at a corresponding point of the skin on the opposite side. Use either catgut, kangaroo tendon, or silkworm gut for vaginal sutures. After using silkworm gut leave the sutures in for three weeks; then have an assistant lift up the anterior wall of the vagina and retract the labia while removing them. Use silkworm gut for suturing the tear of the perineal body and leave the sutures in ten days.

Fig. 177.—Tear of the Perineal Body, Extending into Rectum. Four catgut sutures introduced through the rectal mucous membrane on one side and appearing on torn surface ¼ inch from edge, thence through opposite torn surface emerging from mucous membrane, the fourth suture including the torn ends of the sphincter. Additional silkworm-gut suture passed through skin somewhat deeply behind the ends of the sphincter, across to the other side and emerging from point corresponding to the point of entrance.

Repair of Laceration of the Pelvic Floor and the Perineal Body extending into the Rectum.—This is one of the most difficult operations in the whole range of midwifery and surgery. There is not a clean cut through these structures, but an irregular ragged tear with bruising of the tissues. The patient will almost certainly be in an exhausted condition. It may be necessary to wait not simply one day, but several days, before operating. It is often better to wait until there are clean granulating surfaces, with a certainty that there is no necrosed tissue in the wounds. There should be a skilled assistant in addition to a nurse and anæsthetist. If one has not acquired considerable skill in the performance of such operations, he should procure an expert.

Description of Operation. Place the patient on her back across the bed and prepare as before described. First close the tear in the rectum by catgut or kangaroo tendon sutures. Introduce the first suture close to the apex of the tear on the rectal side, through the septum across to the other side of the tear, coming out on the rectal side at a point corresponding to point of entrance, and tie at once. Introduce a set of interrupted sutures until the sphincter is reached. Approximate the two torn ends if possible. These ends are probably far apart, and not easily seen because retracted. Some recommend us to draw out these torn ends with a tenaculum so as to enable us to pass the catgut through the muscle. The suture connecting these torn ends may be buried.

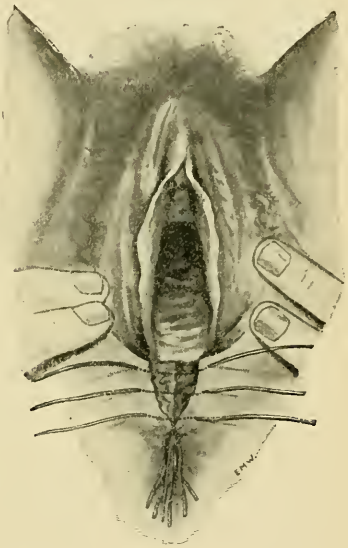


Fig. 178.—Internal Catgut Sutures Tied with Long Ends Protruding from Rectum. External silkworm-gut suture also tied. Buried sutures introduced for perineal tear.

Before tying the last suture introduce one or two sutures of silkworm gut from the outside. The first of these is especially to assist in the restoration of the sphincter, and is really the old suture recommended by Emmett and Thomas many years ago. Introduce the needle (I prefer the straight needle for this purpose) behind the torn end of the sphincter on one side, push it upward and inward until it emerges at a point near the united rectal edges about $\frac{3}{4}$ inch above the anus, then reintroduce it, push it downward and outward until it comes out at a point behind torn end of sphincter on the other side and tie it. This suture is, I think, the most important one in the restoration of the functions of the sphincter ani. Introduce a second silkworm-gut suture about half an inch above this and pass in and out in a direction parallel to the former suture, but do not tie at once. These are sometimes called reenforcing sutures. Now inspect the bottom of the wound, and if there is any doubt about the sutures already

introduced and tied on the rectal side, introduce two, three, or more buried catgut or kangaroo-tendon sutures or a continuous running suture.

Then repair the pelvic floor as before described by introducing catgut sutures, commencing at the apex of the tear, tying and cutting short the sutures as they are introduced. Or if silkworm gut is used, leave for three weeks as in last operation. Then introduce your silkworm gut transversely through what remains of the torn perineal body. Probably only two or three sutures will be required to complete this part of the operation. Then tie these sutures, commencing with the lowest—i. e., the second reenforcing suture.

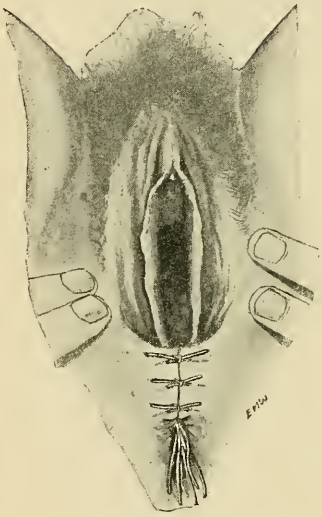


Fig. 179.—Perineal Sutures Tied.

These sutures are sometimes left about two inches long and fastened together at their ends or cut short near the knots. In the latter case the sharp ends often cause pain; in such cases the offending piece of gut should be readjusted.

After-treatment. Separate the labia and cleanse the parts by a gentle stream of lysol or sublimate solution or squeeze the solution from a ball of soaked absorbent cotton. Make adjacent parts clean and dry, apply the antiseptic vulvar pad, place patient in bed on her back. After the slighter operations it is not necessary to bind the legs together; sometimes, but not always, it is advisable to do so after the more serious ones. The patient may be allowed to turn slowly in bed and at the same time to flex both thighs together to a slight extent. Catheterization is only to be done when actually necessary. Give castor oil or a mild saline cathartic, such as sodium phosphate, Rochelle salt, or magnesium citrate, on the evening of or the next morning after the operation, or perhaps both. Endeavor to get the bowels moved before hard fæces are formed and before the sphincter has recovered its tone after the ordinary relaxation produced during labor.

Some, however, prefer to wait two or three days and then give the cathartic, and follow some hours after with careful administration of half a pint of warm sweet oil, the enema to be repeated in four to six hours if necessary. When the vulvar pads are changed, and after catheterization, voiding urine, or movements of the bowel, cleanse the parts after separating the labia as before described. In most cases a vaginal douche of half to a pint of ½–1 per cent. solution of lysol may be given in the gentlest possible way night and morning for cleansing purposes. Keep the patient in bed two weeks after the small and three weeks after the larger operations.

Notwithstanding the unfavorable location and the usual bruising of the tissues the results of these operations are generally good. If only partial union takes place, always perform a second operation in ten days or two weeks. If some sloughing occurs, wait until the necrosed tissues separate. Freshen the granulating surfaces as before described and suture.

INDUCTION OF ABORTION

The methods of inducing abortion are to a large extent those which have already been described under immediate active intervention in inevitable abortion.

Vaginal Tamponade.—When successful, it has a great advantage in not destroying the ovum. The introduction of the uterine sound into the uterus, and turning it round to be sure of rupturing the egg-shell, is an old-fashioned and frequently unsatisfactory method of inducing abortion. Such a procedure frequently causes that dangerous condition which is known as incomplete abortion. I should never recommend the use of the sound alone, but rather in conjunction with the vaginal tamponade. This combined procedure with sound and tampon requires but little skill and involves very slight danger. It may be repeated daily for a week if necessary.

Rapid Dilatation of Cervix and Curettement is the most certain and satisfactory method in skilled hands. It is, however, an "operation" requiring as a rule an assistant to administer an anæsthetic and involving a certain amount of danger. In country practice the other methods are simpler and safer.

Operation. Prepare the patient as before directed; anæsthetize; introduce a perineal retractor and pull backward; seize the

anterior lip of the cervix with a volsella forceps and draw well downward. Dilate the cervix if necessary by artificial dilator or otherwise. Introduce the finger or a curette into the uterine cavity and remove completely the contents of the uterus. Then administer an intra-uterine douche of weak lysol solution and afterward pack with iodoform gauze.

The cervical dilators most commonly used in Canada are Hegar's dilators or some modification of them, such as those of Leiter or Hanks, or MacNaughton-Jones, and the Goodell's metallic expanding dilator or some modification of it, such as that of Palmer. The metallic dilator is more rapid in action than the graduated vulcanite and aluminum bougies, but is considered by many to be more dangerous. Tents, so commonly used at one time, have been to a great extent discarded, because of the difficulty of making them aseptic.

INDUCTION OF PREMATURE LABOR

Premature labor is labor occurring between the twenty-eighth week of pregnancy and full term. Induction of premature labor is mechanical interference to excite uterine contractions and bring on labor at this period. The indications for the induction of premature labor are: a contracted pelvis, causing defective proportion between the child and mother; a head found too large or prematurely ossified in previous labors; a dangerous illness of the mother from excessive vomiting, albuminuria, uræmic convulsions, chorea with mania, organic disease of heart, lungs, liver; irreducible displacements of uterus; placenta prævia; over-distention of the uterus from dropsy of amnion; the death of children *in utero* in the latter part of former pregnancies.

Method of Induction of Premature Labor.—The method most commonly adopted, the world over, when no special urgency is required, is that of Krause with perhaps the help of fingers or hydrostatic dilators, or both, after dilatation of the cervix has commenced. The patient is prepared properly and placed in the cross-bed position, the bladder and rectum being emptied and the external parts and vagina thoroughly cleansed. A posterior speculum is introduced, and the anterior lip of the cervix is seized with a bullet or volsellum forceps and drawn down. One thus has a good view of the parts and can use the bougie without touching the vaginal

wall, and therefore without danger of carrying vaginal germs (if any are left after the cleansing process) into the uterine cavity. A flexible gum-elastic bougie 12–14 English size (which has been previously sterilized by boiling for ten minutes and then placed in a lysol solution 1–20 or a bichloride solution 1–1000 from which it may be taken for use) is passed into the cervical canal, and then pushed up gently between the membranes and the uterine wall as far as possible.

The bougie should pass up into the uterus 7 or 8 inches, leaving about 1 or 2 inches in the vagina. In the first attempt it is pushed along the posterior uterine wall. One should try to avoid two things: puncture of the membranes and detachment of a portion of the placenta. If the bougie meets with any resistance, it is withdrawn a certain distance and again pushed upward, allowing it to take its own direction. If it again meets with resistance, it is withdrawn and pushed in another direction, say to the right or left or front, and when it is started on the new route it is allowed again to take its own direction as far as possible. The bougie may be used without a stylet, and probably the majority of physicians prefer this method. If the stylet is used there is greater danger of puncturing the membranes. To avoid this the bougie is pushed with stylet only to the internal os or 1 inch past it, keeping close to the posterior uterine wall. Then an assistant holds the stylet while the bougie is pushed off it into the upper uterine cavity.

The greater part of the bougie is now in the uterine cavity, and it is hoped that the tip has reached the fundus. Sometimes, but not often, one can be certain of this from the sensation produced on the outside hand pressing on the fundus. An inch or two of the bougie is outside the cervix in the vagina. Introduce an iodoform vaginal tampon, first around the exposed part of the bougie, then over its end. The tampon should be sufficiently tight to prevent protrusion of the bougie from the uterus. Still greater distention of the vault of the vagina with a tightly packed plug can do no harm, and is likely to help the intra-uterine portion of the bougie in inducing uterine contractions.

Although the method described is excellent in all respects, the speculum and volsellum forceps are not necessary, at least, in all cases. The index or index and middle finger are introduced up to the cervix to act as a guide. Then the bougie is passed as before directed into the uterine cavity.

Never use a catheter instead of a bougie, because of the danger of admitting air into the uterine cavity.

Other methods are mentioned in text-books. Some of these are worse than useless, and others which are useful under certain circumstances will be described under Accouchement Forcé. Among former methods which have been generally discarded are puncture of the membranes (dangerous to both child and mother); vaginal douches (generally uncertain and inefficient); *Cohen's method* of passing catheter between the membranes and uterine walls, and injecting slowly seven or eight ounces of warm water (unsatisfactory and dangerous); *administration of oxytocics*, such as ergot (generally ineffective and dangerous); *Pelzer's method* by injection of three ounces of sterilized glycerine between the membranes and the uterine wall (dangerous).

ACCOUCHEMENT FORCÉ

This term is applied to an operation which includes two procedures: (1) rapid dilatation of the cervix; (2) rapid delivery of fœtus and placenta. In former times the operation was sometimes performed with considerable violence. The hand was forced hurriedly through the cervical canal into the uterine cavity. The hand after its introduction quickly grasped a foot, turned, and extracted the child as rapidly as possible. The results were often bad and the operation for some time became unpopular. It appears to be coming again into favor. We are told that the improvements in the methods of dilatation and the introduction of better surgical methods have greatly enlarged the scope of the procedure. While these statements are true to a certain extent, we have to recognize the fact that the operation is still extremely dangerous, especially in the hands of the modern strenuous obstetrician who desires to accomplish as much in one hour as another can manage with safety only in three or four.

When speaking of placenta prævia I referred to a case where a prominent and skilful practitioner of Toronto caused rupture of the uterus by a moderate traction on the child after version. Whitridge Williams recently published the following report: A patient in her sixth pregnancy had repeated hæmorrhages due to placenta prævia. During an examination after admission to the hospital such profuse hæmorrhage occurred that immediate inter-

ference was necessary. Dr. Williams intended merely to dilate the os sufficiently to allow the introduction of two fingers for bipolar version, but the cervix yielded so readily that he completed dilatation easily and apparently without any injury by Harris's method. Subsequently, however, after death an examination showed that in addition to a deep tear of the cervix, which had been discovered and sutured, there was a rupture of the uterus extending from the cervical tear up to the contraction ring. Such an accident in the practice of a careful and conscientious expert should impress upon all the dangers connected with such procedure.

The essential element in accouchement forcé is rapid dilatation of the cervix uteri; it is *occasionally* indicated in cases of eclampsia, hæmorrhage from separation of placenta (ante-partum), prolonged, especially dry, labor, various conditions necessitating the induction of abortion or premature labor. Most of these conditions have already been discussed, but I desire to make certain repetitions.

Where eclampsia occurs during pregnancy while the cervix is still intact, it is better promptly to treat the toxæmia and resulting convulsions. When eclampsia occurs after effacement of the cervix or early in labor, do two things: treat the condition, hasten delivery. In hæmorrhage from placenta prævia, artificial dilatation is very dangerous and should never be done.

Rapid Dilatation of the Cervix Uteri.—Many of the procedures and instruments recently used aid us materially, but all involve some danger. The following may be considered: fingers and hands, elastic and inelastic bags, metallic dilators, cervical incisions.

Fingers and Hands. No instruments yet devised are equal to the fingers and hands intelligently used for rapid dilatation of the cervix. The best method of rapid dilatation of the cervix is that recommended by Harris. Push the index finger to its largest diameter through the os if necessary. Then insert the tips of the thumb and index fingers together within the os. This is the important thing in the procedure. Slide the thumb along the index finger in a direction away from its tip, and also finger along the thumb. One can put much force in this movement without turning the hand and generally cause considerable dilatation. After this has been accomplished introduce the tip of the second finger

with those of the thumb and index finger. Then slide the thumb and two fingers over each other. Then introduce successively the third and fourth fingers, and flex all the fingers while you are sliding the thumb over the index and second fingers. This can be better understood after examining the accompanying dia-

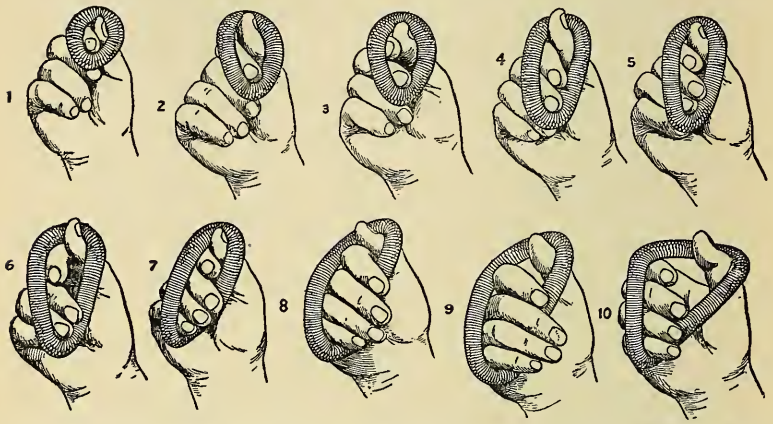


Fig. 180.—Diagrams Illustrating Manual Dilatation of Cervix (Harris).

grams. Another method frequently adopted is to introduce successively one, two, three, and four fingers, forming all in the shape of a cone and always pressing upward, while with the other hand counter-pressure is made over the fundus uteri through the abdominal wall. Others prefer to use both hands and introduce the two index fingers back to back.

Elastic and Inelastic Bags. About the middle of last century Carl Braun devised an elastic bag called a colpeurynter, which he placed in the vagina and then distended it with a view of stopping hæmorrhages and dilating the cervix. Shortly after Barnes used elastic fiddle-shaped dilators for the cervix. These were used for many years, but have recently given place largely to Champetier de Ribes's bags, which are much used on the Continent, in Great Britain, the United States, and Canada.

The de Ribes hydrostatic dilators are conical bags made of inelastic waterproofed silk. Instead of the set of bags our dealers in Canada generally have only the largest size. The base of the large bag measures $3\frac{1}{2}$ inches, and the bag tapers 6 inches to the apex, which has a diameter of $\frac{1}{2}$ inch. The dilator after being

sterilized is folded along its long axis, caught in a specially designed forceps, and passed gently through the os and cervical canal, if not effaced, into the uterine cavity. It is generally better to use a speculum and get a full view of the cervix. The anterior lip is then seized with a volsella while the bag is introduced. The bag is sometimes introduced before the membranes are ruptured, but this is not safe because its distention generally causes intense pain by the sudden stretching of the uterine muscular fibers, as in accidental concealed hæmorrhage.

Previous dilatation if required may be effected by some artificial dilator. A fountain douche is then attached to the nozzle of the dilator, and as the fountain is raised the lysol solution runs into the bag. As soon as the latter is sufficiently filled to insure its retention within the uterine cavity the forceps is withdrawn. About 22 ounces may be injected. If this cannot be accomplished with the elevated fountain, and full distention is required, a Higginson syringe should be used. After distention the stopcock is turned to retain the solution. Twenty-two ounces will cause a maximum circumference of about 13 inches; 18 ounces, 10 inches; 15 ounces, 8 inches. As soon as the cervix is sufficiently dilated the bag is expelled by the uterine contraction. In case of head presentation the bag should be fully distended. If rapid dilatation is desired steady or intermittent traction may be made on the tube. The steady traction is sometimes made by the attachment to the tube of a slight weight running over a pulley at the foot of the bed. The tension of the bag within the uterus may be alternately increased and diminished by raising and lowering the fountain of the douche syringe.

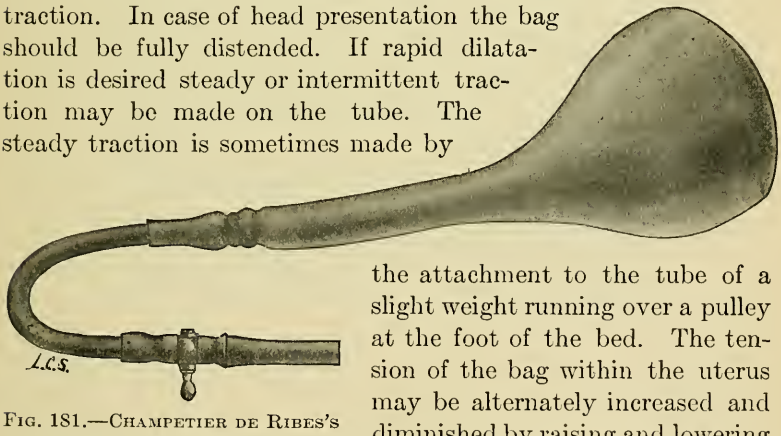


Fig. 181.—Champetier de Ribes's Balloon (Williams). × ⅓.

While these different procedures may occasionally be useful, it is generally safer and quite sufficient to leave the bag quietly in position after introduction. This large foreign body will generally excite uterine contractions, and then Nature can complete

the dilatation safely and efficiently. Traction may sometimes cause rupture of the lower segment of the uterus, just as it not infrequently does in the case of traction on the leg after version for placenta prævia.

It is stated that the waterproofed silk of the de Ribes balloon is more durable than the rubber of the Barnes bag, but I have found both perishable. I fear that the silk, even when carefully prepared,

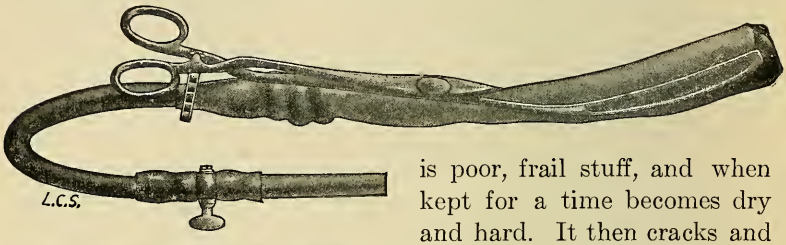


Fig. 182.—Champetier de Ribes's Balloon ready for Introduction (Williams).

is poor, frail stuff, and when kept for a time becomes dry and hard. It then cracks and breaks up when manipulated. These bags, whether made of rubber or prepared silk, have proved most unsatisfactory in the hands of many country practitioners for the reasons mentioned. The de Ribes bags, however, have been largely used, especially in maternity hospitals. While visiting the Sloan Lying-in Hospital of New York last year, I was surprised to learn the frequency of the use of the de Ribes and the Voorhees cone bags. It appeared to be a matter of routine in certain classes of cases, without any consideration of other and simpler methods.

The perishable nature of the silk bag is not its only drawback. When distended within the uterine cavity it is a large foreign body 13 inches in circumference, which frequently displaces the presenting part and permits prolapse of the cord. I have endeavored to show both the advantages and the disadvantages of this much used bag. It occupies an important place in midwifery, but the place is somewhat limited for practice outside of maternity hospitals.

Voorhees's Inelastic Rubber Cones. Voorhees, of New York, uses a cone-shaped bag somewhat similar to the de Ribes, but shorter and stronger. Dickinson tells us that this simple, strong, short cone, inelastic, thin enough to slip in when rolled wherever the finger-tip will pass, with no stop-cock to get out of order, is durable, efficient, and inexpensive. The set of four costs $1.50,

while the de Ribes set costs $6.00. I now carry those bags in my satchel instead of the de Ribes balloon. The Voorhees cone is used in a manner similar to that of the de Ribes balloon, but it is introduced with the aid of any slender long-clamp forceps. When the bag is distended its tube is clamped by an ordinary forceps. Slight traction on the tube may be employed in some cases.

The hydrostatic dilators may occasionally be used in cases of placenta prævia (slight traction, if any, to be employed), separation of placenta, and for the induction of premature labor for various

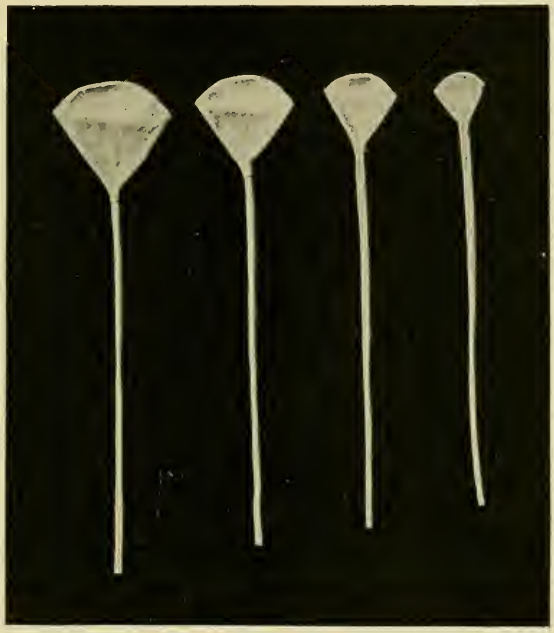


Fig. 183.—Voorhees's Dilating Bags.

causes; or they may be used in conjunction with other methods of inducing or shortening labor.

Metallic Dilators. Various dilators have been constructed for rapid dilatation of the cervix, but the one which now claims special attention is that designed by Bossi, of Genoa, in 1890. The Bossi dilator is a four-branched uterine dilator, with a strong screw on the handle and an indicator to show the amount of the dilatation.

The four branches when closed form one body which is introduced within the os uteri. The blades are sometimes covered with rubber tubing before introduction. After insertion the blades are separated by a quarter turn of the screw every two minutes. It is used chiefly for cases of eclampsia when rapid delivery is indicated. It should never be used in cases of placenta prævia.

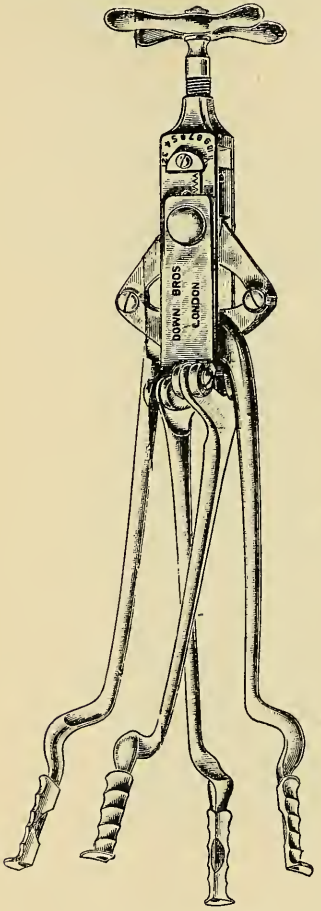


Fig. 184.—Bossi's Dilator.

It is claimed that the cervix can be safely dilated with this instrument in from twenty to sixty minutes. We have clear evidence, however, from many operators, that this is not true in all cases. It frequently causes serious tears, especially when used before effacement of the cervix. Dührssen, the great advocate for cervical incisions in labor, has published in considerable detail his views on the cases reported on the Continent and has expressed a positive opinion that the Bossi dilator is both dangerous and inefficient. On the other hand, several conservative obstetricians strongly favor it as an efficient instrument in certain cases.

Cervical Incisions.—Although incisions of the cervix in labor have been made by various obstetricians for at least a century, we are especially interested in the work of Carl Braun, Skutsch, and Dührssen during the last twenty-five years. The latter has been the strongest and most persistent advocate of the procedure

during the last fifteen years. The operation is indicated in those rare cases of extreme rigidity due to preexisting disease or injury resulting in cicatrices where dilatation cannot be effected by ordinary methods. In addition, it is occasionally indicated in rigidity from unknown causes, but not nearly so often as recommended by Dührssen, according to the opinions generally held in Canada.

As this operation is always dangerous it is important to have a clear idea of the physiology of dilatation of the cervix, as has been explained in connection with normal labor. In primiparæ, dilatation commences at the internal os and extends downward to the external os. The cervix is thus effaced before dilatation of the external os occurs. In multiparæ, dilatation of the external os generally takes place to some extent before it commences at the internal os. The cervix is thus not effaced until labor is considerably advanced.

Cervical incisions should never be made until effacement of the cervix is completed.

Operation. The patient is properly prepared and placed on her back across the bed. An assistant administers an anæsthetic. The left hand is passed into the vagina, leaving the thumb outside. The index or middle finger is introduced within the os and another finger is placed outside the cervix. These two fingers will generally fix the cervix and serve as a guide for the scissors. A pair of blunt-pointed scissors bent at the knee is taken in the right hand and introduced along the fingers within the vagina, one blade within and the other without the cervix, and an incision is made with one or two cuts up to the vaginal vault on each side. These two lateral incisions may be sufficient. If not, a posterior incision is made. There are now three incisions. Dührssen thinks that two or three are generally sufficient, although in one case he found seven incisions necessary. When the cervix is yielding Dührssen introduces specula which are held by an assistant, while he fixes the cervix with a volsellum on each side of the site of the incision and cuts between them. He also thinks that the incisions need not be sutured, because the unsutured wounds heal as well as the sutured.

Immediate delivery should follow the incisions, the forceps being applied if necessary. If hæmorrhage occurs the wounds should be sutured if possible. If this cannot be done a utero-vaginal tampon should be used. Holmes, who recently read an

excellent paper on this subject before the Chicago Gynæcological Society, considers that in view of the post-partum repair which may be required there should be two assistants in addition to the anæsthetist for this operation.

VERSION

Version means turning the child in the uterus and altering the existing presentation to one more favorable. The indications for performing this operation are: a presentation of the shoulder, deformity of the pelvis, presentation of brow or other malpresentation of the head, placenta prævia, prolapse of the cord, prolapse of one or both arms or of an arm and a foot, and emergencies arising from eclampsia, detachment of the placenta, rupture of the uterus, etc. It is positively contra-indicated when there is

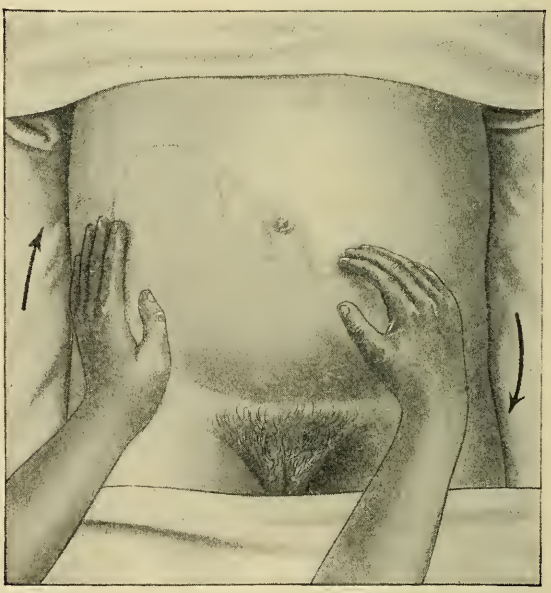


Fig. 185.—External Cephalic Version (Pinard).

retraction of Bandl's ring high above the symphysis, especially when the uterus above it is hard like a bullet. The conditions which should be present, or are most favorable for a successful issue, are as follows: when the pelvis is roomy and the child not

unduly large; when the uterus is distended by liquor amnii; when the os is dilated or dilatable; when the uterine walls are not tetanically constricted around the child.

When the part of the child that is brought down is considered, version is divided into two classes: (1) cephalic, when the head is brought down; (2) pelvic, including podalic, when the pelvis or foot is brought down. When the methods employed to turn the child are considered it is classified as (1) external, (2) combined external and internal or bipolar, and (3) internal.

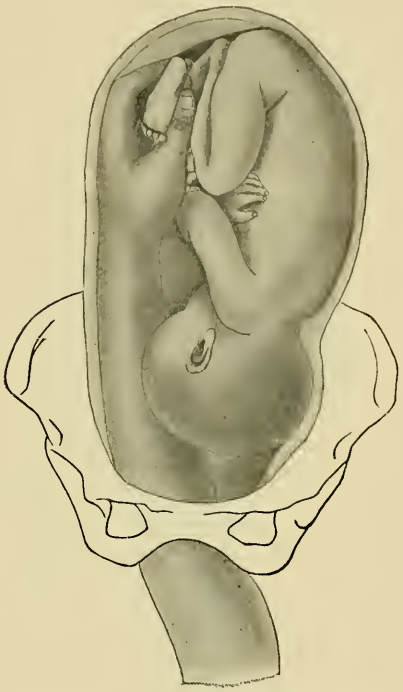


Fig. 186.—Seizure of Foot in Internal Podalic Version (Tarnier).

External Method.—In this method external manipulation—i. e., manipulation over the mother's abdomen alone—is used. The best example of this is seen in the conversion of a breech into a head presentation. The operator may stand at the side of the patient while she is lying close to the edge of the bed; or between her thighs when she is placed across the bed. Manipulations should be made between pains, not during pains, one hand being on the breech and the other on the head.

Combined or Bipolar Method.—Braxton Hicks's way of performing this is very common in England. He places the patient on her left side and introduces his left hand into the vagina. On the Continent and in America it is generally preferred to have the patient in the cross-bed position, the operator standing between her thighs. In all cases a previous knowledge of the position of the child, acquired by abdominal palpation, is of paramount importance. If it is a head presentation this should be converted, first,

into a transverse. It has now to be decided which hand the operator should introduce into the vagina. The right hand is introduced when the child's feet are turned to the mother's right side, and the left when they are turned to her left. The whole hand is introduced into the vagina and two fingers into the uterus, rupturing the membranes, if this has not already occurred. The head should be pushed up with the internal hand and the breech downward with the external. The conversion into a breech is now completed. In this turn the child's back should be turned to the fundus of the uterus. A foot should now be seized and pulled downward into the vagina, while the external hand is transferred to the other side and the head pushed upward. Sometimes when the os is not fully dilated it will be found impossible to bring the foot into the vagina. As Jellett expresses it, the os may be large enough to admit the two fingers or the foot alone, but not large enough for the foot and fingers together. In such a case he advises that the foot be brought down until the toes are through the os internum. Then the fingers should be drawn down into the vagina and an endeavor made to push the cervix over the foot. At the same time the external hand should press over the breech through the abdominal walls, so causing the foot to descend. The foot is then again seized and drawn downward, and at the same time the head is pushed upward with the external hand.

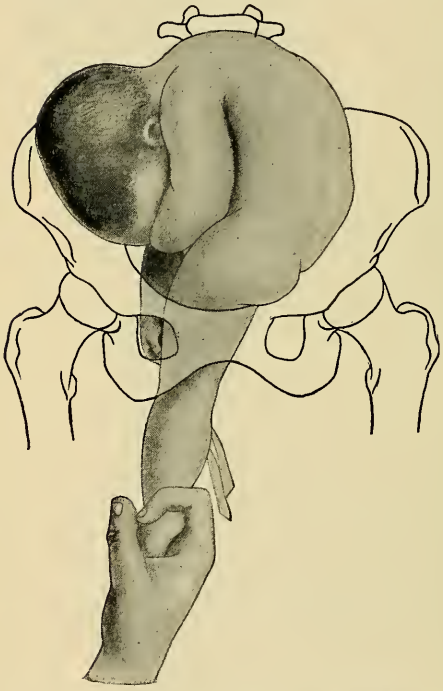


Fig. 187.—Version: Transverse Presentation, Back Posterior, Seizure of Upper Foot (Williams).

Internal Method.—In this method the whole hand, not the two fingers alone, is introduced into the uterus. The same procedure as in the bipolar method is adopted, but the greater part of the work is accomplished by the internal hand. Occasionally the external hand cannot push the head up while the foot is being brought down. In such a case bring down the second foot and pull both feet. If traction then fails, take a strip of iodoform gauze and apply it to one or both ankles by a slip knot or clove hitch. Traction should be made on this strip with one hand outside the vagina, and at the same time the other hand in the vagina pushes the head upward out of the false pelvis (Jellett).

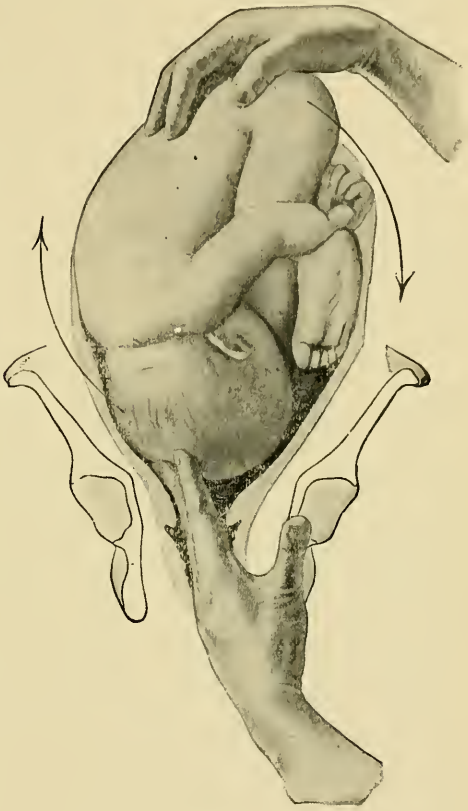


Fig. 188.—Bipolar Podalic Version (Bumm).

In these operations deep anæsthesia is required, not alone to render the abdominal walls lax, but to insure against prolapse of the cord brought on by the straining of a patient not sufficiently anæsthetized. In carrying out these methods of procedure care should be taken not to use too great force, for fear of rupturing the uterus. This accident is not apt to occur if version is undertaken soon after the rupture of the membranes, provided the operation is carefully performed.

CHAPTER XXV

OBSTETRICAL OPERATIONS (Continued)

DELIVERY WITH THE FORCEPS

Prof. Japp Sinclair, of Manchester, came to Canada in 1897, and told us that the obstetricians were the providers of material for the gynæcologists through unskilful use of the midwifery forceps. Baudeloque, on the other hand, has stated that the midwifery forceps is the most valuable instrument that has yet been invented. We believe the great mass of obstetricians in all civilized countries indorse this statement, and conscientiously and intelligently use the forceps to shorten the suffering and diminish the risks at childbirth. No one will deny that much injury is done in certain cases by the unskilful use of the forceps. According to Sinclair and the few who agree with him, the common fault is the premature use of the forceps. Dr. Lapthorn Smith, of Montreal, makes the very serious accusation that the doctors use the instrument early without any regard to the condition of the parts, simply to save time. This is, of course, not a new charge, and we may admit that some physicians apply the forceps prematurely to save their own time and suit their own convenience. The man, however, who does such a thing is guilty of a criminal act. Every physician should recognize the fact that premature use of the forceps is always dangerous, and should make it a positive rule in practice never to use the forceps through a partially dilated os. The forceps should never be used as dilators.

Milne Murray refers to a form of spasmodic rigidity which is especially dangerous for forceps delivery. For instance, a woman has been in labor many hours. After a time an examination during an interval between the pains shows the os soft, flabby, fairly well dilated or at least dilatable. Some chloroform is administered and the forceps are slipped over the head, of course within the os. During the following pain the os becomes spasmodically

contracted round the head and forceps and not more than half its apparent size. Dr. Murray considers such a condition an example of uterine incoordination, or uterine *stammer*. Traction under such circumstances will tear the cervix into the vaginal roof with sometimes most disastrous results. Careful examination, *which should always be made* during a pain as well as during the interval, will prevent one from making such a deplorable blunder.

Reference has been made to secondary inertia. It is of course a condition which involves some danger as to the use of the forceps, but it should not be considered a positive contra-indication. Sometimes it is more dangerous not to interfere in a case of secondary inertia than to deliver slowly and carefully with the forceps. It is somewhat confusing to a student to be told that the use of the forceps during uterine inertia is exceedingly dangerous, and afterward to learn that feebleness of pains is one of the indications for the use of the forceps.

While we should avoid the premature use of the forceps, we should not go to the opposite extreme and fail to use them when necessary. In former times when the forceps were used less frequently by the majority, and not at all by some, that horrible condition, vesico-vaginal fistula, was not uncommon. It is now comparatively rare. This is, however, telling a small part of the story. Dr. Murray says much in a few words when he tells us that by means of the forceps we have saved hundreds and thousands of weary hours and preserved countless children alive.

The suitable conditions of the patient and the indications for the application of the forceps may be summarized as follows:

Suitable Conditions.—The os dilated or dilatable; the vagina and internal genitals softened and dilatable; the membranes ruptured; the skull of child sufficiently large and firm; the head engaged (with rare exceptions); the pelvis sufficiently large; the rectum and bladder empty.

The Indications.—The indications for the use of the forceps are as follows: When the mother is in danger from exhaustion from prolonged second stage; where there is a slight pelvic contraction and the choice lies between the use of the forceps and version; where there is a delayed face presentation, especially when the chin is rotating to the front; when there is a hæmorrhage of any kind, or rupture of the uterus. It is also indicated in some cases

of occipito-posterior positions, but it is better to wait as long as possible or correct the position if possible. It is indicated too when the child is in danger from prolapse of the cord, threatened asphyxia from any cause, or impaction of funis.

This list of indications for forceps interference is practically that found in standard text-books, but it is neither scientific nor accurate. One should consider that each of the conditions named *may* render the use of the forceps advisable. These conditions have been discussed in former chapters.

As before stated, the second stage of labor should be as short as possible. When all the soft parts, from cervix uteri to the vulva, inclusive, are softened and dilated or dilatable, quick delivery of the child is desired. To accomplish this the forceps are used in certain cases. When shall we use them? This is not an easy question to answer definitely. Milne Murray lays down a rule to which he attaches much importance. "A direct indication for the use of the forceps arises whenever, and only whenever, we are

Fig. 189.—Abdomen of Primiparæ at Term, showing Striæ.

assured that the danger of interference has become less than that of leaving the patient alone." He claims that this is more than a mere truism, inasmuch as it implies that the use of the forceps is nearly always a matter of individual judgment. He considers that there is no accepted set of rules which can be applied to every emergency.

At the Rotunda a definite time limit for the second stage has been recognized for several years. That limit, when I heard last, was four hours. The same limit was observed in St. Mary's and Queen Charlotte's Hospitals for some time, but in 1897 the maximum duration was altered from four to two hours. Many express the opinion that the time element alone is not a proper basis for such interference. I quite concur, and yet I believe firmly in the time limit, although I do not depend upon that *alone*. I also doubt whether any one at the Rotunda, St. Mary's, or Queen Charlotte depends on the time element *alone*.

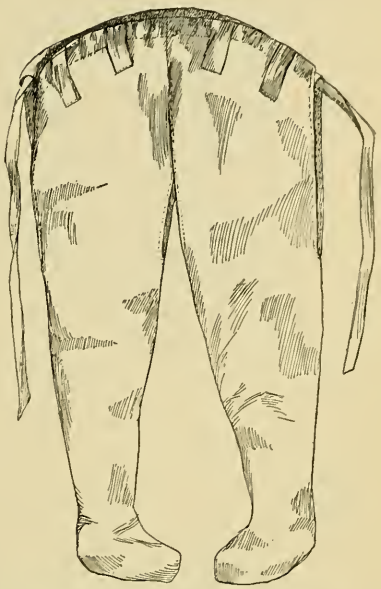


Fig. 190.—The Snively Stocking-Drawers.

I saw a patient recently in consultation with a very competent and careful young practitioner. The parts, I was informed, had been dilated about eight hours. The doctor was trying to reach a conclusion whether or not the time had arrived "when the danger of interference had become less than that of leaving the patient alone." The patient, although tired, was not suffering acute pain. The time limitation, if observed, would have prevented such prolonged delay with associated dangers. I think the maximum duration of the second stage should be three hours for primiparæ and two hours for multiparæ. This does not mean that in all cases one should wait for the three or two hours; but it does mean that in no case should one wait any longer. In a large proportion of cases it is neither necessary nor advisable to defer the application of the forceps for more than one hour after full dilatation of the cervix, vagina, and vulva. "When the passages are in a fit state, and Nature fails to advance the head, apply the forceps" (Simpson).

Position of the Patient.—The lithotomy position for the patient is generally used in Canada, the United States, and the Continent

of Europe. We think it is much better than the left lateral, especially in all cases of difficulty. We sympathize with those who object to undue exposure and cover the parts as well as possible.

The Snively Stocking-Drawers.—The best available protecting garment, so far as I know, is the combination of stockings and drawers designed by Miss Snively. They are made of canton flannel, flannelette, or strong factory cotton. They are retained in position by means of tape which acts as a belt around the waist, preventing the possibility of slipping. They are adjustable to such an extent that they do not interfere with the operator, as they are open both back and front and also on either side. In addition to these openings, the front is so arranged that it may be allowed to drop down away from the abdomen in cases where this may be necessary without interfering with the protection afforded by the combination elsewhere.

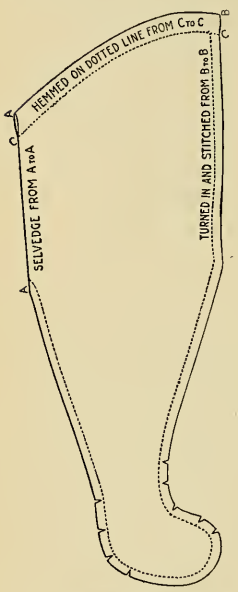


Fig. 191.—Pattern of Snively Stocking-Drawers.

It is generally advisable to fasten the thighs in the flexed position. I generally use for this purpose Robb's leg-holder. One end is fastened to a leg below the knee. The rest of the band is passed over one shoulder, across the back, under the other shoulder, and the other end of the band is fastened to the other leg below the knee. The old-fashioned sheet sling is quite satisfactory. It is made by two persons holding diagonally opposite corners of a sheet and rolling the hanging portion around the part held taut until a sort of rope is formed. One end of this is tied to the leg below the knee, or sometimes to the thigh near the knee. The sling is passed (like Robb's strap) over one shoulder, under the other, and the end is tied to the other leg. If the band or sling is properly adjusted it tends to abduct or separate the knees; while a sling passed under the knees, round the neck, with the ends then tied together (as sometimes recommended) would tend to draw the knees together and would be extremely uncomfortable for the patient.

Kinds of Forceps.—There are three kinds of forceps: (1) short, straight; (2) long, two curves; (3) axis-traction. Each blade of

Fig. 192.—Patient on table in lithotomy position, wearing the Snively stocking-drawers; vulva covered with small towel fastened with safety-pins, Robb's leg-holder applied. Upper part of patient hidden from view by curtain stretched across the room (Burnside Lying-in Hospital).

the long forceps and the axis-traction forceps has two curves: a cephalic curve to adapt itself to child's head and a pelvic curve to adapt itself to shape of pelvis, especially when the head is high.

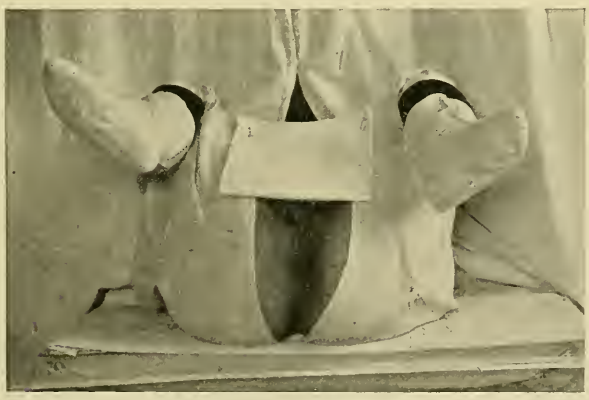


Fig. 193.—Lower half of towel turned up and pinned, leaving sufficient exposure to apply the forceps or operate on pelvic floor and perinæum.

There is also a curve on each traction rod, and sometimes a third curve on the shank, as in Galabin's axis-traction forceps. There

are three kinds of locks: English, Smellie, with shoulder projecting from each half of instrument, the two shoulders fitting into one

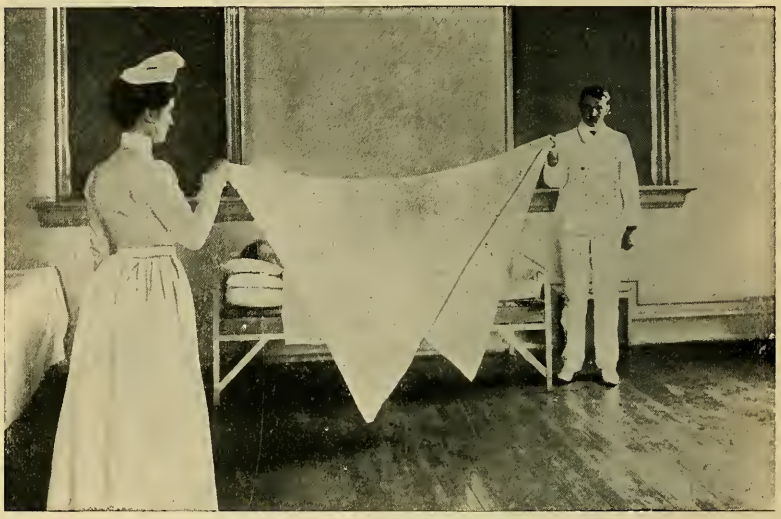


Fig. 194.—Making Sheet Sling, First Stage.

another by inclined planes: French, pivot having a projection or tenon on one arm which is inserted into a cavity or mortise on the

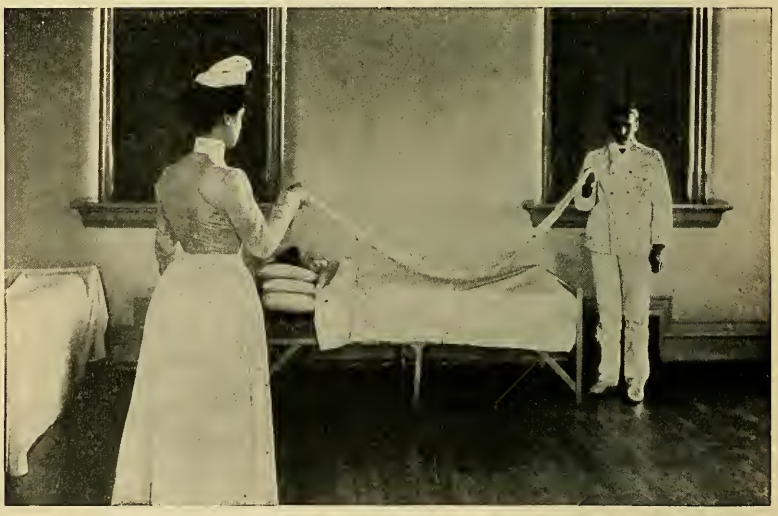


Fig. 195.—Making Sheet Sling, Second Stage.

other, with a screw to hold them in position; German, one arm biting into the other, while a pin on one fits into a notch on the other.

Choice of Forceps.—The varieties of forceps mentioned are the short, long, and the modified long—i. e., the long forceps with axis-traction appliances. The object of Tarnier in making his instrument was to have it so adjusted that the force in traction should

FIG. 196.—SHEET SLING.

lie in the true axis of the pelvis at all its planes, and that no part of that force should be either wasted or used in such a way as to cause injury.

One can understand a part of this better by considering the action of the ordinary long forceps when applied at the superior strait. The axis of the superior strait points toward the lower part of the sacrum. The perinæum, the coccyx, and a small portion of the sacrum being in front of the axis of the brim prevent the handles from being pushed back to allow direct traction. Consequently, part of the force of traction is wasted in dragging the head against the symphysis pubis. This defect in the ordinary

long forceps was clearly recognized more than one hundred years ago, and many devices were tried to overcome the difficulty, with

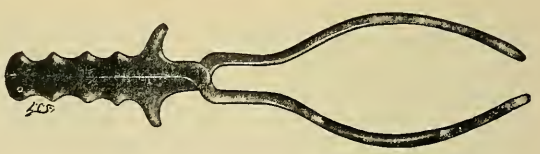


Fig. 197.—Simpson's Forceps, Cephalic Curve.

a certain amount of success. One of the most common devices is known as Pajot's maneuvers (Fig. 202).

Tarnier solved the problem in 1877 by attaching one traction rod to each blade of the forceps and fastening both rods to a handle or crossbar. His original instrument was rather clumsy, and he

Fig. 198.—Simpson's Forceps, Pelvic Curve.

made many improvements on it before his death. Many slight modifications have been made in various parts of the world. As a rule, all that are constructed on the Tarnier axis-traction principle are good. But no such modification as the attachment of tapes by loops passed through the fenestræ of the blades or the perineal curve of Galabin is satisfactory. I fear that even Neville's forceps, so highly lauded by the Rotunda men, is not a true axis-tractor.

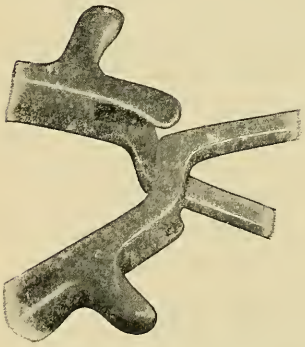


Fig. 199.—Lock of English Forceps.

I used the Milne Murray modification of Tarnier with much satisfaction for about ten years, but when in Paris three years ago I got the latest Tarnier forceps as recommended by Pinard. After using this instrument for a time I found it unsatisfactory. I then decided to either go back to the Milne Murray instrument or choose the Porter Mathew forceps, which Dr. McIlwraith has used for some

years with excellent results. After careful comparison I have chosen for my own use the Mathew axis-traction forceps. The choice in this part of Canada lies largely between Milne Murray and Porter Mathew, many preferring the former.

Description of the Milne Murray Axis-Traction Forceps.—The application handles are smooth and light and 6 in. in length. The ordinary Smellie lock is used, and the shanks are straight, strong, 2.5 in. in length and .75 in. between their inner surfaces. The blades are 5.75 in. in length, measured along the cord of the pelvic curve (this arc has a radius of 7 in.). The termination of the arc joins the shanks, so that the axis of the instruments and the cord form an angle of 120°. The solid part of the blade measures 1.75 in. The fenestrum is 4 in. in length. The blades are kept in position by a fixation screw of the ordinary pattern, the butterfly-nut being prevented from coming off by a pin driven through the upper head of the screw. The traction-rods are hinged to the blades. They lie on the outside of

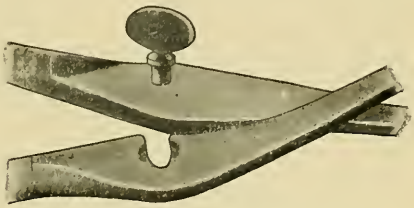


Fig. 200.—Lock of French Forceps.

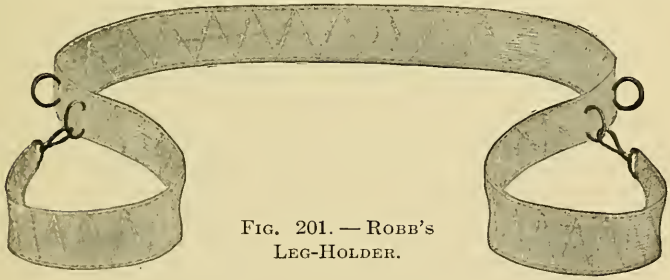


Fig. 201. — Robb's Leg-Holder.

the solid part of the blade, against which they fit snugly. From their attachment the rods curve round the blades, and are bent at an angle so as to lie straight beside and a little to the outside of the shanks.

One inch below the lock they are bent by an easy curve backward, and terminate in two flattened surfaces, in which are inserted the traction-handle studs. About half-way along the back curve is the traction-rod lock. It consists of a pin fixed to the lower

traction-rod which enters a mortise on the upper, in which it is held by a simple bolt. Its object is to bind the two rods into one system and make sure that the force of traction is equally distributed on the two blades.

The inclination of the flattened surfaces terminating the rods and carrying the traction-bar studs is a matter of essential importance. It must be such that the traction-bar plate when attached must be absolutely in the tangential line of the curve when the rods are touching the shanks.

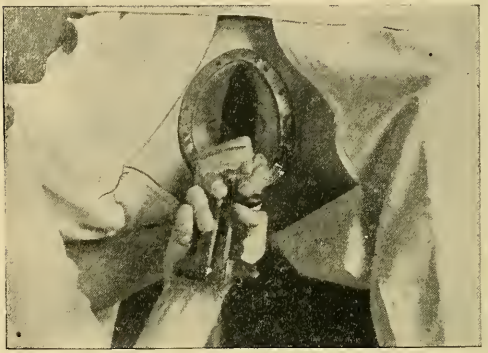


Fig. 202.—Pajot's maneuver by which he endeavors to carry out the axis-traction principle with the ordinary long forceps (Elliott's). The right hand making traction on the handles. Two fingers of the left hand over the shanks drawing backward.

The distance of the studs from the center of the handles in these instruments is 3.5 in. The studs are square in section with large heads. The traction-bar plate is attached by a couple of key-holes, and when drawn down should fit firmly without to-and-fro motion of any sort. The traction-handle possesses a hinge-joint giving lateral motion, and the bar is attached by a swivel.

The traction-rods are jointed to the blades, and run down close to the shanks and along the back of the handles, and at a point half-way down they then turn back at a right angle. The horizontal part of these rods is oval in section, and the upper one is divided into distances half an inch apart, which are numbered 0 to 7.

The handle is applied to these horizontal rods by a block pierced to allow them to pass through. This block can be fixed in any position by a pinching screw, which is secured in such a way that it cannot slip out. To this block is fixed the handle by a joint which permits motion in a plane parallel to the rods. This motion is necessary to allow the handle to fall into the proper line of traction for each position on the rods.

To the pin of the hinge-joint is fixed a sector, which moves

with the handle. The periphery of the sector has marked on it the position proper to it for each position of the block on the rods. Against one of these marks is placed the word "normal." When the handle is adjusted to this mark the instrument is, as regards construction and efficiency, an ordinary pair of axis-traction forceps.

To adapt them to a pelvis whose inclination is less than normal, it is only necessary to shift the block one or more divisions nearer the handle; while to adapt them to one whose inclination is greater than normal, the block must be moved one or two divisions farther from the handle. If the index is kept at the figure on the section corresponding to the figure at which the block is set on the handle, the line of traction will always pass through the center

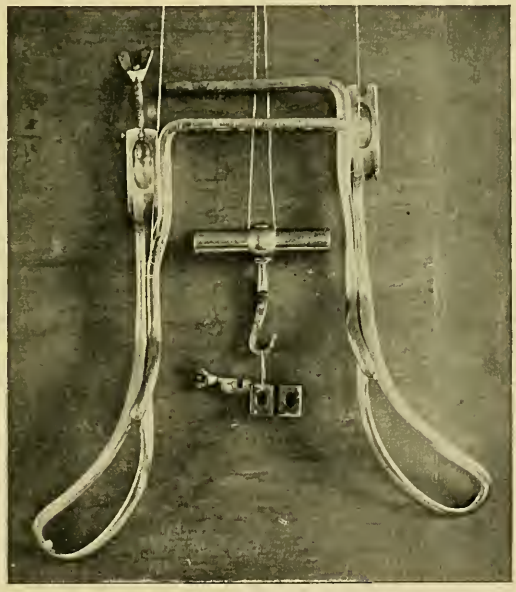


Fig. 203.—Porter Mathew Forceps Disarticulated; Front and Back View of Blades.

of the fenestrum; but, of course, its inclination to the vertical will vary with the position on the rods at which the handle is fixed.

Dr. Murray has another forceps which is older and better known in this country than the one described and is constructed for the normally curved pelvis. In it the traction-rods are not

rectangular, but slightly curved, and end in two flattened spaces to which the traction-handle is attached.

Description of the Porter Mathew Axis-Traction Forceps.—The forceps are made entirely of metal and can be sterilized by boiling. The traction-rods are detachable and easily cleaned. The weight, especially where undesirable, has been diminished as much as is consistent with perfect rigidity, the diminution being most marked in the application-handles, the latter thereby acting the more efficiently as true indicators of the change in the direction of the descending head. There are no screws or fixed joints except to those parts outside the vulva, and such screws as are present, few in number, are not easily lost. When the head is delivered, it is only necessary (without touching the traction apparatus) to give a few turns to the large screw on the handles, when the blades slip off the head.

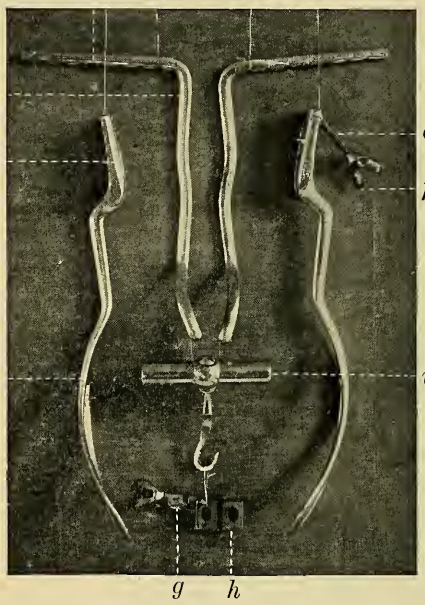


FIG. 204.—PORTER MATHEW FORCEPS DISARTICULATED; SIDE VIEW OF BLADES.

a, traction-rod; *b*, portion of traction-rod to which traction-block is applied; *c*, handle of blade; *d*, blade; *e*, fixation screw; *f*, butterfly-nut of fixation screw; *g*, traction-block; *h*, catch of block with a screw and butterfly-nut; *i*, traction-handle.

The blades have a pelvic curve of a 7-inch radius; this enables a good grasp to be obtained on the correct plane of the head. They are stout but narrower than ordinary blades, rendering them easy of introduction and manipulation, and of special service in those difficult cases of flattened pelvis when the head lies transversely at the brim. By being narrow they grasp only the occipital and frontal bones, avoiding the parietals, enabling the latter to mold without hindrance in the diameter of greatest obstruction.

The lock is a close-fitting, ordinary English lock; a model has

also been made with reversed lock. The close-fitting lock insures the blades when locked, being properly adapted to the head.

The application handles have been much shortened and lightened. Once the blades are applied the handles become merely "indicators" and are not designed for traction. Owing to their lightness they do not "fall downward," and the slightest movement of the head is communicated to them; being so delicate a guide, to insure proper axis-traction throughout the operator has merely to pull, keeping the traction-rods constantly parallel and close to the application handles as the latter move forward with descent. Another great advantage of the short handle is, that on locking the forceps the second traction-rod falls into position without having to be carried far forward to clear a long application handle. An objection that the short handle would upset the balance of the blade and make it difficult of introduction with the head high up, has been found to be purely theoretical even above the brim, for in introduction the traction-rod and handle are grasped together, and will be found to give a comfortable and convenient hold, the left blade being passed with its traction-rod behind the handle, the right blade with its rod just in front of the handle. On locking, the second traction-rod slips backward into position beside the first traction-rod.

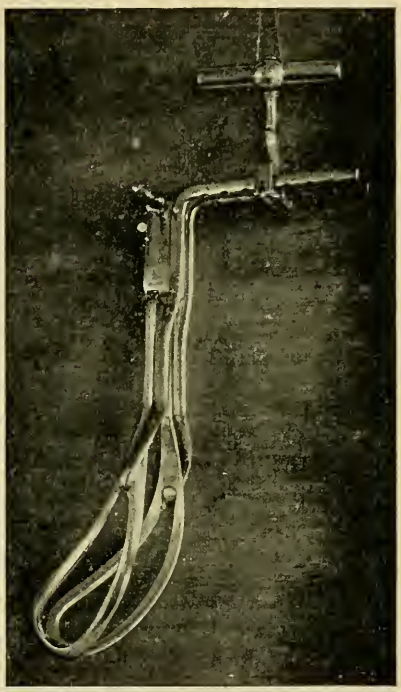


Fig. 205.—Porter Mathew Forceps Articulated.

Catch of block underneath and closed in fourth notch of traction-rod, fixation screw fastened at end of handles.

The traction-rods are the well-known rectangular ones of Dr. Milne Murray. The forceps are thus true for all pelves, instead of being true only for a normal pelvis. By an ingenious contri-

vance, copied from Dr. Cullingworth's forceps, the rods are easily detachable by an aseptic joint, the old objectionable screws being done away with.

The traction-block. Much time and care have been expended by Messrs. Down Bros. (who have made the forceps) in designing a new form of traction-block which should be mathematically and mechanically correct, and yet have the advantage of simplicity, lightness, ease, and rapidity of application and admit of being easily cleansed. The great difficulty has been to avoid screws, which might be lost and make the instrument temporarily useless. To insure asepsis it can be boiled. One movement fixes the block and rods securely.

Fig. 206.—Porter Mathew Forceps. Blades and traction-rod held in hands before application.

The line of traction has been calculated by "shadow projection," the ray of light being kept perpendicular to the blade; very accurate results are obtained by this means.

The two instruments are much alike. The Porter Mathew is simply a modification of the Milne Murray, but it is smaller and lighter; its blades have a slightly different cephalic curve and are more easily applied, and its traction-rods are more easily got into position for the attachment of the traction-handle.

Some of the advantages of the axis-traction forceps may be cited, quoting largely from Milne Murray. The great advantage of its use at the brim is generally understood and admitted. In many cases the axis-traction instrument will accomplish what the ordinary long forceps cannot do. "For once they have proved their efficacy at the brim, they have done so ten times in the cavity and twenty times at the outlet." The blades grasp the head securely without producing dangerous compression. Extraction is accomplished with comparative ease and without any waste of force. It is necessary only to preserve the proper relationship between the traction-rods and the shanks. By keeping the

instrument on the head until delivery there will generally be less injury to the pelvic floor and the perinæum. At no stage will the instrument prevent flexion and rotation of the child's head.

Application of the Murray Forceps.—The blades are joined with concavity of pelvic curve forward. The handle of the left blade is taken in the left hand. The handle is held in the full hand with the thumb lying on its inner surface while the other fingers are distributed over the outer surface near the lock. The fingers of the right hand are placed in the vagina with tips between cervix and the child's head. The blade is passed along palmar aspect of fingers toward the sacrum or slightly toward the left side of the pelvis, the handle being held well upward. As the tip of the blade enters the handle is brought downward along the internal surface of the mother's right thigh, and the blade is brought toward the side of the pelvis. While introducing the left blade the traction-rod is allowed to remain below (hanging downward). The shank of the blade will now pass against the perinæum. The handle is kept steady with the wrist, or an assistant holds it. The handle of the remaining blade is taken in the right hand. The axis-traction is kept upward out of the way. The fingers of the left hand are placed in the vagina, and the right blade is introduced as in the case of the left blade. If a pain comes on during the application of a blade, manipulations cease until the pain has passed off. The handles are taken in the two hands, the blades adjusted and locked, and the screw is fastened. One traction-rod is now below and the other above. The latter is pulled down beside and below the locked blades. The two traction-rods are now below the application handles. The traction-handle is attached to the two traction-rods.

Fig. 207.—Application of First Blade. Porter Mathew Forceps.

Application of Porter Mathew Forceps.—The traction-block and handle are laid aside at first, but the blades are applied with the traction-rods in place. The patient is in the dorsal position. The left blade is taken in the left hand, the thumb in the angle of the traction-rod, and the fingers encircling the traction-rod and handle and keeping them close together. The fingers of the right hand are introduced into the vagina and the blade applied along their palmar surface as in the Murray forceps application. The handle of this blade being kept back out of the way by an assistant, the right blade is grasped in the right hand, as follows: The traction-rod is carried far enough forward to bring it in front of its handle, the fingers encircling the handle; the butterfly-nut of the fixation-screw is run out to the end of its screw, and the screw itself turned out, away from the traction-rod, and allowed to project between the first and second fingers; the traction-rod is kept in position by gentle pressure with the thumb on the outer side of its angle; the rectangular part of the rod projects backward between the thumb and the fingers. Grasping the blade thus, it is applied like the second blade of the Murray forceps; as the lock is closed the traction-rod falls easily back into position behind its handle. The fixation screw is then turned into its place and the nut screwed home, not tightly, but just enough to keep the handles as closely together as they can be brought by gentle pressure with the hands. Then take the traction-block, open its catch widely and run the butterfly-nut out to the end of its screw. Then slip the block on to the rods, taking care that the catch is on the side next to the notches in them. Slip it up the rods until three notches are passed and close the catch into the fourth notch, which is the

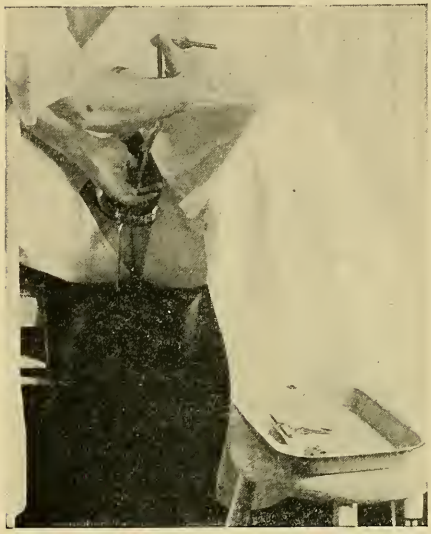


Fig. 208.—Application of Second Blade. Porter Mathew Forceps.

position for normal pelves, and screw the nut home. For flat pelves the block is fixed in the fifth, sixth, or seventh notch, according to circumstances—i. e., traction is made in each notch until that notch is found in which the head comes most readily. For "small round pelves" the block is fixed similarly at third or second. The handle is then hooked over the bar provided for that purpose, not over the catch.

Traction is made keeping the traction-rods just parallel to the handles, not pushing against them nor widely separated from them. All traction must be made with the traction-handle, neither the traction-rods nor the handles of the blades being touched. As the head comes down the handles will be found to turn upward and forward. This indicates the direction in which traction is to be made, and each change in position must therefore be closely followed by the traction-rods.

In removing the forceps the traction-block and handle are first removed. The fixation screw is then undone and turned outward. The right traction-rod is then carried in front of its handle and the right blade removed in the reverse direction of its application. The left blade is then similarly removed, except that its traction-rod does not need to be carried forward.

Fig. 209.—Blades Locked and Traction-Handle applied. Porter Mathew Forceps.

When using the ordinary long or short forceps introduce the blades and lock as described for the application of the Murray forceps. This is illustrated by cuts showing what Williams calls low forceps introduction (Figs. 210 to 213).

How shall the Blades be Applied?—According to many authorities in Great Britain and Germany, our aim should be to so apply the blades that they will be parallel to the sides of the mother's pelvis. Many obstetricians in France and America endeavor to apply the blades to the sides of the child's head without regard to the sides of the pelvis. The differences of opinion in certain

communities are very decided. Take the University of Edinburgh, for instance, where we find the extra-mural differing from the intra-mural teacher. The one tells us that it is largely the teaching and the practice of the British schools to apply the forceps as far as possible in relation to the pelvic transverse without reference to the position of the head. He at the same time expresses a positive opinion that this is wrong when the head is not properly rotated. The result of this practice is to obtain an oblique grasp of the head, which causes difficulties in locking and certain dangers. Even though locking be accomplished without injury, the head as it descends rotates, causing the edges of the blades, if there is no removal and readjustment, to do much damage to the outlet. Or the head descends without rotating and engages the outlet in the oblique with results still more disastrous. An author representing the other side of Edinburgh tells us that the long forceps are always applied laterally as to the pelvis, no regard being paid to their grasp of the head. Clarence Webster, another Edinburgh man, considers the French method unscientific, ridiculous, and dangerous.

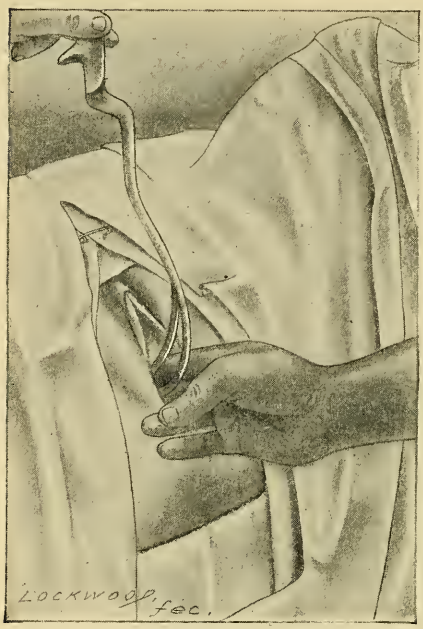


Fig. 210.—Introduction of Left Blade. Ordinary Long Forceps (Williams).

Dr. Murray prefers the French method, and advises us to apply the blades to the biparietal diameter of the child's head wherever situated. As the head descends rotation brings the blades into the transverse diameter when the occiput comes to the front. The application of the blades to the sides of the head requires more care, but it is our duty to take what care is necessary for the benefit of the patient. There is nothing new in these allegations, nor have I any doubt that they are correct. Not-

withstanding my admiration for the French method, however, I have for years hesitated about recommending it universally to my classes, nor am I prepared to do so now.

Why not adopt the French method in all cases? Because it requires more skill than the average obstetrician can acquire in a lifetime to accomplish it safely in a large proportion of cases. Strenuous efforts to apply the blades to the parietal diameter of the head in difficult cases are dangerous to both mother and child. A large proportion of obstetricians are convinced that theoretically the French method is excellent, but practically it is often dangerous and even impossible. At least such is my experience, and I have been endeavoring to carry out the French method for fifteen years.

The following rules are recommended: One should try to ascertain the exact position of the child's head, and endeavor to apply the blades to the sides of the head without regard to the sides of the pelvis—i. e., make an effort to employ the French method. If unable to accomplish this, apply the blades laterally as to the pelvis, but do not drag the head far before removing and readjusting the blades. It is comparatively easy in certain cases to apply the blades to the sides of the head. If, for instance, the head is in the cavity of the pelvis with the occiput toward the left front, one has only to introduce the blades so that the left blade will be slightly behind on the left side and the right blade slightly forward on the right side. Sometimes one can scarcely avoid doing this.

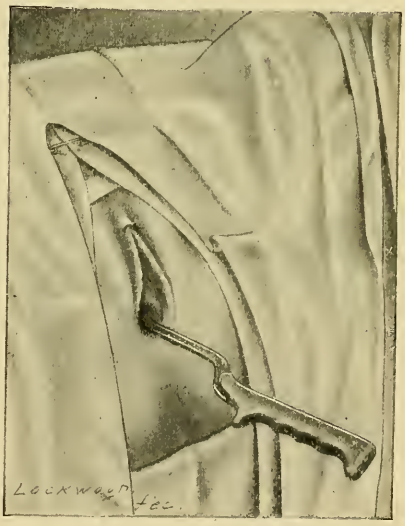


Fig. 211.—Left Blade in Place. Ordinary Long Forceps (Williams).

Traction.—Seize the handle which is attached to the traction-rods with the one hand, and while pulling see that the rods and shanks are kept just touching, or almost touching each other.

While thus extracting the child one will find that the traction is exerted exactly in the right direction at all times as the head passes through the pelvis and emerges from the vulva; flexion will be properly maintained, and when incomplete will frequently be promoted; rotation will be allowed; the head will so far as possible be prevented from bearing too heavily on the pelvic floor; the head will be lifted over the perinæum; and as the head is brought through the vulva it will not be extended so as to cause the chin to cut through the perinæum.

Fig. 212.—Introduction of Right Blade. Ordinary Long Forceps (Williams).

In using traction do not attempt to extract rapidly. It was before stated that during normal labor, after the vault of the head reaches the pelvic floor, its expulsion from the vulva should occupy at least from twenty to thirty minutes. Extraction with the forceps should occupy no less time. Pull gently on the handle, as far as possible during pains, and desist during the intervals between them. If unable to detect uterine contractions, pull intermittently. Endeavor to extract with the smallest amount of force. Use one hand at first; this will generally be sufficient. In exceptional cases it will not, and then one will require more force and may use two hands.

As soon as the head reaches the pelvic floor one should consider the danger of injury to that structure and the perinæum. It was stated in connection with normal labor that when the thighs are flexed on the body a tightening of the skin around the

vulva occurs. The patient is directed to extend the legs and thighs in order to slacken this tension. This tightening is still more apt to occur when the thighs are fastened in the flexed position with some form of leg-holder. It is extremely important, therefore, to observe the following rule:

As soon as the head commences to press on the pelvic floor observe the time, remove the leg-holder, and allow extension of the thighs—i. e., allow the legs and thighs to hang over the edge of the bed or over the end of the operating table toward the floor. In an ordinary bed the patient's feet may rest on the floor while the nurse keeps the thighs separated by holding the knees outward.

Do not employ less than twenty to thirty minutes in extracting the head after it has reached the pelvic floor. I attach a great deal of importance to this rule. It is very desirable that the operator take his time from a watch or clock and not trust to guess-work. Twenty to thirty minutes will appear a long time, especially if one has seen some strenuous and muscular operator drag the head over the pelvic floor and through the vulva in about a minute. In order to do so, however, he may require to use a force of one or two hundred pounds, while the safe operator by a slower and less brilliant method may only require to use a force of one to ten pounds. The former will probably provide some material for the gynæcologist, while the latter will lift the head over the pelvic floor and through the vulva without inflicting any injury. While pulling gently and intermittently for fifteen to twenty-five minutes, the anæsthetic may be withheld to some extent, but it should be freely administered while the head

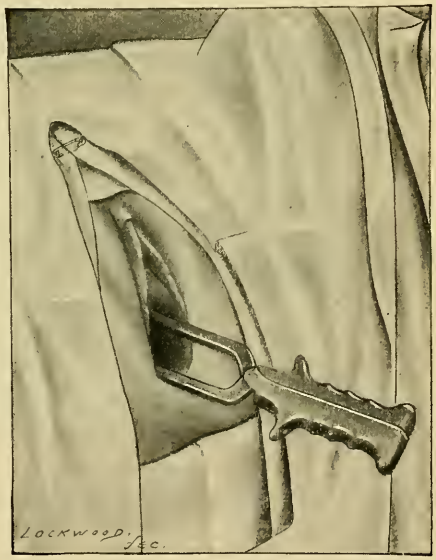


Fig. 213.—Forceps Locked.
Ordinary Long Forceps (Williams).

is emerging from the vulva. Occasionally the uterine contractions assist expulsion while the head is pressing on the pelvic floor, and expedite delivery. If Nature's efforts should suddenly become violent, have the anæsthetic freely administered, leave the forceps in position, and guide the passage of the head so as to make it glide over rather than cut into the pelvic floor. While exerting slight traction on the cross-bar with the one hand to

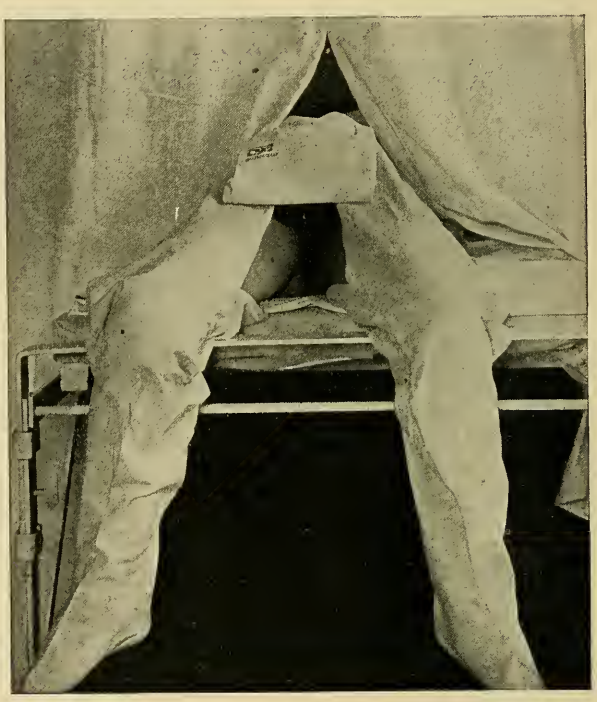


Fig. 214.—Walcher's Position

pull the head toward the pubic arch, it is sometimes advisable to push against the advancing head with the fingers of the other hand to prevent too rapid expulsion.

While Milne Murray generally employs traction during the pains, he refers to one group of cases where a different plan should be adopted. It sometimes happens, especially in elderly primiparæ, that every uterine contraction when the head is low is accompanied by spasmodic action of the muscles of the pelvic floor, which narrows or tightens the vulvar orifice and causes rigidity

of the pelvic floor and perinæum. In such a case deepen the anæsthesia and employ traction only during the intervals between the pains.

As before intimated, in the majority of cases in the high and middle operations the blades will generally grasp the head obliquely. It is not safe to drag the head far before removing and readjusting the blades. The following rules are recommended: As soon as the position of the blades shows that rotation of the head has commenced, remove the blades, reintroduce and readjust them. Otherwise do not remove the forceps until after complete delivery of the head. During the delivery of the head, even while it is passing over the perinæum, continue to pull on the cross-bar without regard to the application handles. Many, if not most, obstetrical authorities in the United States only use the traction in high and middle operations, and some only use them in the high operations. Some authorities, both in Great Britain and the United States, relax the fixation screw during the interval between making traction. This is unnecessary when using either the Murray or Mathew forceps, because (as mentioned before) the blades grasp the head securely without producing dangerous compression, and the compression is not increased during traction as it is when using the ordinary short or long forceps.

If the old forceps without the traction-rods and cross-bar are used, apply and lock as described for Milne Murray's instrument. If the head is high in the pelvis, pull first downward and backward. As the head descends bring the handles gradually toward the front—i. e., toward the mother's abdomen. Be careful, however, not to bring the handles too far forward while the head is emerging—i. e., do not extend the head so much that the chin cuts through the perinæum. If the old long forceps is preferred, it is well to select the Simpson or Elliot instrument.

Anæsthesia.—Operative interference adds a new element to labor. It was stated before that an anæsthetic might be administered in two different ways: (1) to the obstetrical degree; (2) to the surgical degree—the obstetrical degree being generally sufficient in normal labor, the surgical degree being generally necessary for operative procedures. We may consider that the latter rule applies to forceps delivery, although not for the same reasons which prevail in other operations. The application of the blades of the forceps and traction during uterine contractions causes

little or no extra pain. We want profound anæsthesia, not especially to prevent pain, but to keep the patient quiet during our manipulation. The violent movements of semi-intoxication may cause serious injuries. One should therefore do one of two things: (1) administer no anæsthetic. This may cause surprise to those who have seen anæsthetics administered as a matter of routine practice in maternity hospitals. Our custom generally in Toronto is to administer the anæsthetic. The country practitioner, however, will often choose to use the forceps without anæsthesia, especially when miles away from a brother physician. (2) Get an assistant to completely anæsthetize the patient, especially during the application of the blades and the delivery of the head through the vulva, as already mentioned. Surgeons generally observe a good rule in making the administration of anæsthetics the work of one man who shall assume full responsibility. Obstetricians would do well to adopt the same rule, which is really the only safe one. Many practitioners, however, allow the nurse to give the anæsthetic. Although they direct the nurse and watch the patient as carefully as possible, such practice involves a certain amount of risk, which may occasionally be considerable.

CHAPTER XXVI

MAJOR OBSTETRICAL OPERATIONS

Cæsarean Section.—This is the removal of the child from the uterus by an incision through the abdominal and uterine walls. It is indicated when abdominal section is the only method by which the child can be delivered; for example, when the conjugate diameter in a generally contracted pelvis measures only $2\frac{1}{2}$ inches; when tumors or cicatrization in the pelvis prevent delivery; when, after the death of the mother, the child can be delivered more quickly by section than in any other way. It is also indicated in certain cases of rupture of the uterus, severe accidental hæmorrhage, etc. Some operate about the end of pregnancy, but before labor begins, while others prefer to wait until labor has commenced.

Operation. The instruments required are a sharp knife, scissors, needles and needle-holder, dissecting forceps, artery forceps (12 pairs), towels, gauze, ligatures, and sponges. Six assistants are required: one to give the anæsthetic, one to assist in lifting out the uterus, one to compress the cervix, one to take charge of the child, and two to take care of sponges, irrigating apparatus, etc. The latter two may be nurses. The patient is prepared as for an ordinary laparotomy, the bowels and bladder are emptied, subumbilical region shaved, and all the parts, including the vagina, thoroughly cleansed with antiseptics, etc.

The abdominal incision is made in the middle line one-third above and two-thirds below, or half above and half below the umbilicus. The assistant, after the uterus is exposed, presses the abdominal walls against it, and the uterine incision, 15–18 cm. long (6–7 inches), is made in the median line commencing at a point just below the fundus and running toward the cervix. Some make the abdominal incisions long enough to allow the uterus to be turned out before opening it. The amnion is ruptured, the breech or one foot or both seized, and the child extracted as rapidly as possible. If the placenta lies in the line of incision,

the fingers should be passed between it and the uterine wall to its margin, where the membranes should be ruptured and the feet grasped as before described. In delivering the child the head should be well flexed. The cord should be clamped by two artery forceps and then divided between them. The placenta and membranes should then be removed. If there is excessive hæmorrhage at any stage, an assistant should grasp the neck of the uterus with both hands and make firm pressure until the deep sutures are introduced. The sutures should be placed in two layers, deep and superficial (Kelly). The deep sutures, two or three to the inch, pass through the entire thickness of the uterine wall down to the decidua. Twice as many sutures of fine silk are introduced through the peritonæum on either side of the incision. Some use half deep sutures after the deep ones are tied, but before the superficial ones are introduced. The abdominal wound is closed in the ordinary way. (Some prefer a transverse incision through the fundus (Fritsch). The after-treatment is the same as that for any laparotomy.

Vaginal Cæsarean Section.—Dührssen advises vaginal Cæsarean section where rapid delivery is indicated. A circular incision is made through the mucosa covering the cervix close to the fornix and extending into each lateral fornix half an inch. The mucosa flap is stripped upward with the bladder, and the cervix pulled down by means of a volsella. The bladder is held up out of danger by a retractor and the cervix divided anteriorly and posteriorly in the middle line. The anterior incision is extended four or five inches up the uterine wall, but not through the peritonæum. The child is extracted through the incision and the placenta and membranes removed. The uterus is plugged with iodoform gauze and the incisions closed with catgut.

Porro's Operation.—This is the supravaginal amputation of the uterus after a Cæsarean section. It is indicated where the uterine tissues have been seriously injured by attempts at delivery; where the child is putrid or where there is septicæmia; where there are extensive adhesions and cicatrices in the vault of the vagina; where fibroids of the uterus exist; where, after abdominal section for ruptured uterus, the tear is found to be very ragged and to involve other structures, or if the hæmorrhage cannot be arrested; where, for sufficient reason, there is a desire to avoid future pregnancies.

Operation. The technique for this operation is the same as that for Cæsarean section up to the point where the child is delivered. Then the placenta and membranes should be left in the uterus and an elastic ligature, loosely tied, passed around the lower uterine segment. To prevent the abdominal cavity being contaminated by uterine fluids, a small opening in a large rubber sheet is passed over the fundus down to the elastic ligature. This ligature is then drawn tight by the assistant and the uterus amputated $\frac{3}{4}$ inch above it. The stump is disinfected and cauterized and may then be treated in one of two ways: (1) extraperitoneal, or (2) intraperitoneal.

In the extraperitoneal treatment the stump is encircled with a loop of a Koeberle's écraseur just below the rubber tubing and the écraseur drawn tight, care being taken not to include the wall of the bladder. The rubber tubing is then removed and two long needles passed through the stump above the wire loop. The abdominal wound is then sutured. The stump is brushed with a solution of the perchloride of iron; if hæmorrhage recurs the wire may be tightened. The needles are removed in from ten to twelve days. In the intraperitoneal treatment the mucous membrane is sutured first, then over this the muscular tissue, and over it the serous membrane. The rubber tubing is then removed, any hæmorrhage controlled by ligatures, and the pedicle dropped into the abdominal cavity. Or the stump may be treated as that in an ordinary myomectomy, a description of which will be found in any text-book on gynæcology.

Total Abdominal Hysterectomy.—Occasionally in some cases it is advisable to remove the whole uterus, especially where there is malignant disease or a very bad rupture. This operation is described in text-books on gynæcology.

Symphysiotomy.—This is the operation of cutting through the symphysis pubis for the purpose of increasing all, but especially the transverse, diameters of the pelvis. It is indicated where the pelvis is so small or deformed as to prevent delivery by version or forceps, but at the same time large enough with the increase in size attained by the operation to allow the delivery of a living child. It occupies, therefore, a position between version and forceps on the one hand, and embryotomy and abdominal section on the other. The range of operation lies between conjugate diameters of $3\frac{1}{8}$ and $2\frac{3}{4}$ inches in a pelvis otherwise normal.

Greater conjugate diameters are required in a pelvis otherwise generally contracted.

Operation. The following instruments are required: a scalpel, a probe-pointed curved bistoury (or a Galbiani or Morrison knife), two or more hæmostatic forceps, needles and needle-holder, a metallic catheter or vulcanite rod, strips of iodoform gauze, silk or wire sutures, strips of adhesive plaster, antiseptic cotton, a strong abdominal binder, obstetric forceps, and a Clover's crutch. Four assistants are required, one to give the anæsthetic, one to hold the catheter in the urethra, one to secure uterine contraction and to express the placenta, and one, a nurse, to take charge of the child.

Italian or Subcutaneous Method.—The genitalia are carefully washed with an antiseptic solution, the mons veneris shaved, and the bowels and bladder emptied. The patient is placed in the lithotomy position with a Clover's crutch. The catheter or vulcanite rod is introduced into the urethra and depressed from the pubic arch and pushed over to the right side. A median incision 2 inches long is made, extending to or a little below the top of the symphysis, deep enough to reach the sheath of the rectus muscle and the joint. Any hæmorrhage is arrested and small transverse incisions are made into the pyramidalis muscle on either side to make room for the finger. The left index finger is then introduced behind the symphysis down to its lower border, the urethra located where it has been depressed and pushed to the right by the catheter (or rod). This being out of the field of operation, the probe-pointed bistoury (or special knife) is introduced along the finger to the lower border of the symphysis. The subpubic ligament is then cut and also the symphysis from below upward and from behind forward. Hæmorrhage may be controlled by plugging with iodoform gauze, and the catheter then removed. An assistant should watch and prevent too great a separation of the bones. Some now leave the case to Nature, waiting from one to twelve hours, interfering when they deem it advisable. Others proceed at once to hasten delivery, dilating the os if necessary and applying forceps or delivering by version. An assistant should, after delivery of the child, express the placenta and keep the uterus contracted. The catheter may now be reintroduced to prevent the urethra from being caught between the bones. The abdominal wound is sutured, the lowest suture passing through the upper

cartilaginous surface of the symphysis. The bones should not be wired. An antiseptic dressing is applied and retained in position by adhesive strapping; the vagina is loosely packed with iodoform gauze. A firm abdominal binder is then applied and the limbs bound together, first placing a pad between the knees. The patient should be kept in bed for from three to five weeks; and when the wound is completely healed an immovable apparatus should be put on to fix the pelvis.

The Open, French, or German Method.—This method differs from the subcutaneous in that an open incision in the median line 3 or 4 inches long is made, beginning ½ inch or 1 inch above the upper border of the symphysis, extending to the root of the clitoris or a little to one side of it. In other respects the two operations are the same.

The operation is dangerous in the following respects: There may be considerable hæmorrhage at the operation. The bladder, urethra, or vagina may be injured. Locomotion may be impaired from faulty union of the pelvic bones or injured sacro-iliac synchrondrosis. There may be septicæmia.

Operation for Ectopic Pregnancy.—The preparation of the patient is the same as for an ordinary laparotomy. An incision about three inches long is made in the abdominal wall in the median line, extending downward from just below the umbilicus. Two fingers are introduced into the abdominal cavity and the uterus sought for, and then from it the Fallopian tubes are easily found. The enlarged one is held between two fingers and brought out through the wound. If rupture has occurred the perforation will generally be easily visible. The broad ligament is then transfixed and tied with interlocking ligatures and the tube cut away. It is generally advisable to wash out the abdominal cavity. The abdominal wound is closed in the usual manner. (The symptoms of ectopic gestation, before and after rupture, and the indications for operation, are given in Chapter XIV.)

Embryotomy.—This is the mutilation of the fœtal body, undertaken to render possible extraction of the child. It should very rarely, or better never, be performed on a living child. Where the patient and her friends absolutely refuse abdominal section it may be done in the following cases: where there is a great disproportion between the child's head and the mother's pelvis; where there is obstruction in the genital canal, due to tumors,

cicatricial contractions, or inflammatory conditions of the soft parts; where malpositions and malpresentations have caused impactions; where there is hydrocephalus or other fœtal deformities; where the mother's life is in serious danger from eclampsia, etc. Some divide it into six varieties: (1) craniotomy, (2) evisceration, (3) decapitation, (4) spondylotomy, (5) spondylolysis, and (6) amputation of extremities. Others divide it simply into two

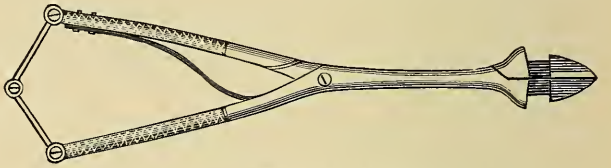


Fig. 215.—Simpson's Perforator.

varieties: craniotomy, denoting the mutilation of the fœtal head, and embryotomy, mutilation of the fœtal trunk.

Craniotomy.—This is perforation and extraction of the fœtal head. The following instruments are required: a perforator (Simpson's being the best), a cephalotribe or basiotribe (head crusher), a craniotractor or cranioclast (head seizer), a pair of volsella forceps, a catheter, and antiseptic solutions.

Operation. The patient should be placed in the lithotomy position and the bladder and rectum emptied. The vulva and

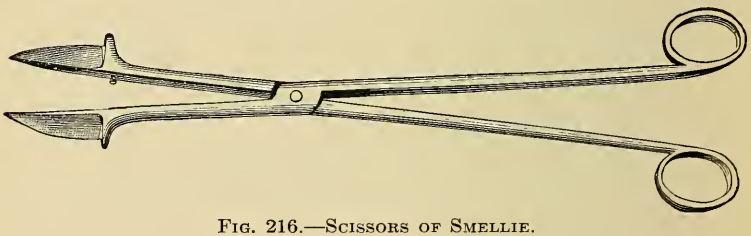


Fig. 216.—Scissors of Smellie.

vagina should be made as nearly aseptic as possible. The head is fixed by an assistant exerting pressure on it from above, and the scalp seized by the volsella near the point of intended perforation. The left index finger is used as a guide and a suture or fontanelle found, through which the head is perforated. If neither suture nor fontanelle can be found, perforation may be made through a bony plate, such as the parietal bone. Others think it

better to perforate through the presenting part, whether it be bone, suture, or fontanelle. In cases of face presentation it is best to perforate through the more accessible orbit, or, failing that,

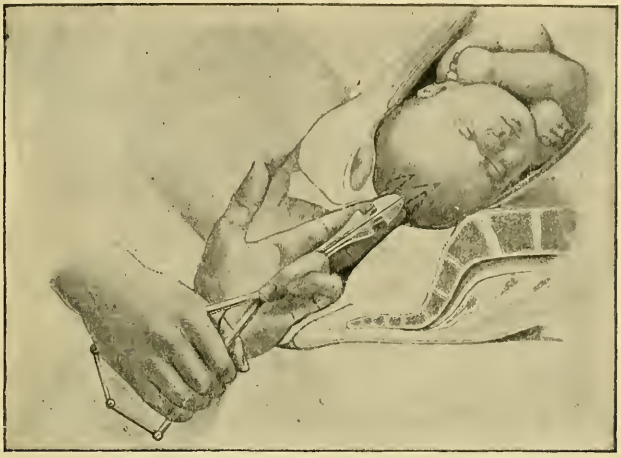


Fig. 217.—Method of Perforating Head (Williams).

through the roof of the mouth. Care should be taken lest the perforator slip; it is least apt to do so if kept near the symphysis. When the perforator is inserted the points should be opened by pressure on the handles. The points are then closed again, the instrument turned on its axis through a right angle and the process repeated. The brain substance, especially the medulla, is then destroyed, and may be washed out if necessary with a stream of

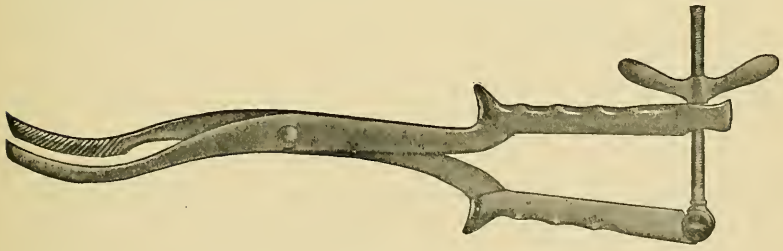


Fig. 218.—Braun's Cranioclast.

sterilized water through a Davidson's syringe. (In some cases after failure to deliver with forceps, it is well to perforate without removing them and then reapply traction.)

Extraction. The child may in some cases be extracted with forceps; in others a cephalotribe is used. The narrow blades are applied to the sides of the skull like ordinary forceps and are made to approach and to crush the skull by means of a screw at the ends of the handles. Others use a cranioclast, applying one blade within the skull and the other without, but underneath the scalp. It may be necessary in some cases to break up the base of the skull with a basylist or basiotribe before extraction. Jellett rec-

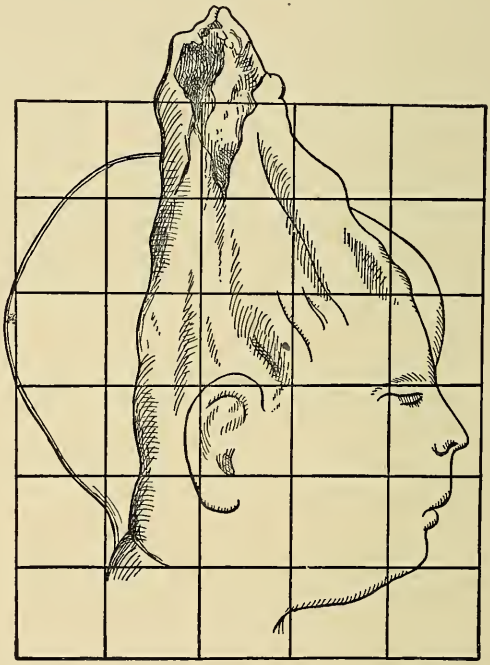


Fig. 219.—Head Crushed by Braun's Cranioclast (Simpson).

ommends for compression and extraction Winter's modification of Auvard's combined cranioclast and cephalotribe, which consists of three blades, a central or male blade resembling the male blade of an ordinary Barnes's cranioclast, and two outside blades which both lock into the central blade. One of these outside blades locks with the central blade so as to form a cranioclast, the other completing the cephalotribe. The Auvard instrument, however, is much superior to this modification.

Evisceration.—This is the operation of opening the thorax or abdomen of the child and removing some of the viscera. It is indicated in those cases where the size of the child's body prevents

Fig. 220.—Tarnier's Cephalotribe.

delivery. A perforator or a pair of scissors is introduced into whatever portion of the trunk is most accessible. Through this opening the hand is passed and some of the larger viscera—liver, lungs, or heart—are removed. The hand is then passed into the uterus, a foot seized and the child extracted.

Decapitation.—This is the operation where the child's head is separated from the trunk at the neck. It is indicated in cases of neglected shoulder presentations when the neck can be reached. A Braun's blunt hook is passed over the neck and the soft parts and spinal column torn through. (Ramsbotham's hook is preferred by most British obstetricians.) The arms are then drawn

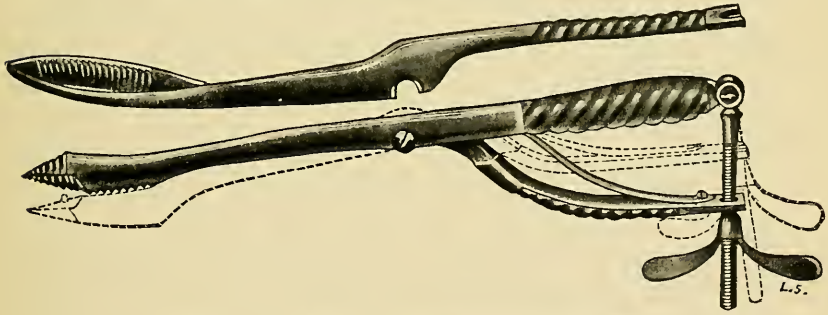


Fig. 221.—Simpson's Basylist, Disarticulated.

down and the trunk extracted first, then the head. When it is difficult or impossible to extract the head, perforation of it may be necessary.

Summary.—In all references to the major operations, including the brief summaries of the indications for the same, an endeavor has been made to give the views of the majority of obstetricians. But it should be remembered and fully appreciated that we are

now passing through an evolution stage, and our views are changing rapidly. Conservative Cæsarean section is becoming very popular. In skilled hands its mortality has been diminished to such

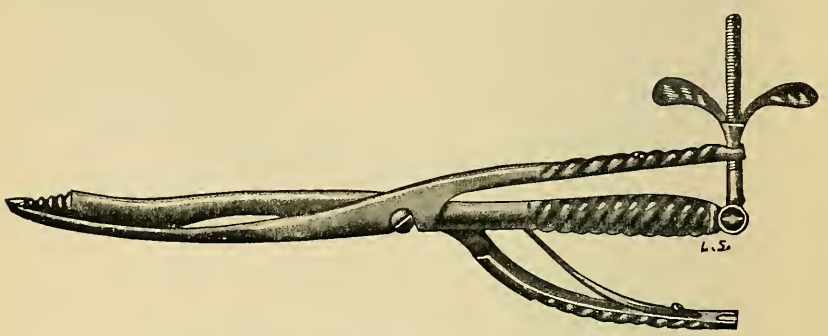


Fig. 222.—Simpson's Basylist, Articulated.

an extent that it is now placed at 3 to 4 per cent. in cases where the women have not been infected before the operation.

Porro's supravaginal amputation of the cervix after removal of the child was popular for many years after its introduction in 1876. Since, however, Sänger introduced his method of performing Cæsarean section in 1882 the Porro operation has rapidly lost ground. One of the supposed advantages of the Porro with the extraperitoneal treatment of the stump was that it could be more easily performed by a general practitioner who was not an expert abdominal surgeon. It was also thought it was a safer operation when there was infection, and that it could be performed more easily than the Cæsarean section. The surgeon of to-day, however, does not attach much importance to these considerations, and generally considers it a very unsatisfactory if not crude operation.

Symphysiotomy is also fast losing its short-lived popularity. In a late report Tissier, of Paris, gave notes of the after-histories of

Fig. 223.—Braun's Blunt Hook.

twenty women who had been delivered by symphysiotomy during the period 1898–1903. The patients were operated on at seven different hospitals. Four only out of the twenty escaped without

some undesirable sequelæ, the remaining sixteen all being more or less damaged by the operation. One patient has been a chronic invalid for five years. Eight suffered from phlebitis. Ten had urinary troubles during months or years, incontinence of urine being the most common affection. A number had difficulty in lifting or going up-stairs. A few years ago the operation was in a large proportion of cases considered successful when it did not cause the death of the patient. Many of the operators were not frank, or at least prompt, in reporting the remote disastrous results such as those mentioned by Tissier. While it has many disadvantages, it is doubtful if it has one advantage over Cæsarean section.

From the present trend of obstetrical surgery it seems not unlikely that Porro's operation and symphysiotomy will soon be obsolete. It is to be hoped that all forms of embryotomy of the living child will be placed in the same category.

It is not improbable that in the near future the following rules will prevail: When Nature fails to expel the child and we cannot safely complete delivery by version or forceps, we must choose a major operation. Cæsarean section will be the operation of election in the great majority of cases; total hysterectomy will be the operation of election in a few exceptional cases when infection is recognized or suspected; embryotomy will be the operation of election when the child is dead and there is only slight pelvic deformity.

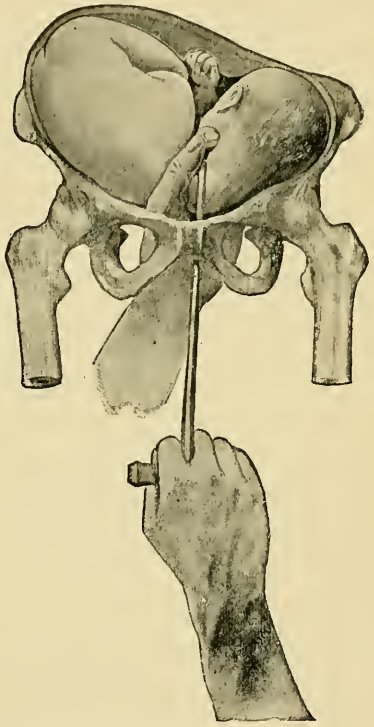


Fig. 224. — Decapitation with Braun's Blunt Hook (American Text-Book).

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